

*CASE NUMBER*  
*DEC 1980*

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ENERGY RESOURCES CONSERVATION BOARD  
Calgary Alberta

CHINOOK MANAGEMENT LTD.  
LICENCE TO DRILL A WELL  
RED WILLOW AREA

Decision Report 80-24  
Application 800590

## 1 INTRODUCTION

Chinook Management Ltd. (Chinook) applied pursuant to the provisions of The Oil and Gas Conservation Act for a licence to drill a well in legal subdivision 14 of section 12, township 40, range 16, west of the 4th meridian to evaluate and obtain production from all formations down to and including the Wabamun Formation. As the proposed well site is within the boundaries of Manalta Coal Ltd.'s (Manalta) Vesta mine, and in an area which Forestburg Collieries Ltd. (Forestburg) plans to use for overburden storage, Manalta, Forestburg, and Alberta Power Limited, the coal rights owner, were advised of the application. Objections were subsequently received from all three parties.

The proposed location of the well and the relevant existing or planned mining operations are shown on Figure 1.

## 2 THE HEARING

A public hearing of the application was held before the Energy Resources Conservation Board (Board) on 2 October 1980 in Calgary, Alberta, with a division of the Board consisting of G. J. DeSorcy, P.Eng., C. J. Goodman, P.Eng., and V. E. Bohme, P.Eng. sitting.

### THOSE WHO APPEARED AT THE HEARING

Principals and Representatives  
(Abbreviations Used in Report)

Witnesses

Chinook Management Ltd.  
(Chinook)  
T. H. Ferguson

J. M. Ballachey  
P. W. Wells

Alberta Power Limited  
(Alberta Power)  
K. D. Wakefield

J. Gunn, P.Eng.  
R. Bellows, P.Eng.

Manalta Coal Limited  
(Manalta)  
R. Melrose

J. H. Decker, P.Eng.  
J. A. Taylor

Forestburg Collieries Limited  
(Forestburg)  
E. L. Bunnell

H. K. Haddock, P.Eng.

Union Oil Company of Canada Limited  
(Union)

B. K. O'Ferrall

Calgary Power Ltd.  
(Calgary Power)  
H. M. Kay

Energy Resources Conservation Board  
staff

K. F. Miller, Board Solicitor  
J. R. Nichol, P.Eng.  
A. Golbey, P.Eng.

### 3 THE ISSUES

The Board considers the principal issues respecting this application to be:

- (a) the surface location of the well,
- (b) the need for the proposed well, and
- (c) the impact of the proposed well site on the mining operations of Manalta and Forestburg.

The following supplementary considerations, although not directly applicable to the application, must be considered in arriving at a decision:

- (a) availability of an acceptable pipeline route, and
- (b) possible alternative solutions to the conflict between the well location and the coal mining operations.

### 4 CLARIFICATION OF INFORMATIONAL LETTER IL 80-14

The Board, in reviewing the application and the evidence and argument of the participants in light of the relevant provisions of The Oil and Gas Conservation Act and regulations and The Coal Conservation Act and regulations, believes it appropriate to comment generally on what it considers to be the intent of Informational Letter IL 80-14.

The informational letter was issued to establish a basic framework for examining conflicting mining and petroleum operations, to encourage negotiations to resolve those conflicts and to inform industry of the lease continuation options available should a well licence application be denied. The "10-year mine plan" criteria was used to establish an approximate area wherein the Board would examine a particular well site to determine the impact of the coal mining and petroleum operations upon each other and to arrive at a solution given the circumstances of the particular case.

The term "10-year mine plan" appears to be subject to different interpretations and in view of the lengthy discussion and argument over its meaning, the Board believes it is appropriate to clarify the use of this term. The Board considers that a 10-year mine plan generally would include top soil stripping, subsoil stripping, overburden removal, and coal extraction. The Board wishes to reiterate that, although the 10-year mine plan is referred to in the Informational Letter, each well licence application will be treated on its own merits regardless of the relationship of the proposed location to the 10-year mine plan. The 10-year period was adopted because it appeared to reflect the time frame needed to re-organize a mine plan, and would allow conflicts occurring approximately within this period to be resolved before issuing the well licence.

## 5 THE SURFACE LOCATION OF THE WELL

### 5.1 The Applicant's Views

Chinook indicated that it had selected the location of a well in LSD 4 of section 12 because:

- (a) its geological interpretations of the area indicated that drilling a well in LSD 14 or 15 would yield the best prospects for a successful venture,
- (b) the well could not be moved any further north and still remain within the target area,
- (c) the proposed location would have little or no impact on Forestburg's mining operations, and
- (d) the proposed location was outside Manalta's 10-year mine plan, and therefore could be approved unconditionally.

Chinook therefore maintained that the proposed location in LSD 14 was the most appropriate location.

The applicant stated that it had examined the possibility for a directional well and believed that it was technically feasible. Chinook had, however, rejected this alternative because of the additional cost of such a well and the belief that it should not bear any increase in cost.

Chinook believed it could accommodate Forestburg's concerns and there would be little or no impact on the Forestburg mining operations. The applicant stated that the proposed location is clearly outside Manalta's 10-year mine plan and, in accordance with Informational Letter IL 80-14, decision on the application should not be influenced by Manalta's mining operation.

## 5.2 The Intervenors' Views

The intervenors stated that a well located at the proposed site would have a significant impact on their mining operations and therefore, they would only agree to the proposed location if the applicant agreed to temporarily abandon the well when each of the mining operations reach the area of the well. In the case of the Forestburg operations, the abandonment procedure would likely only involve capping the well at surface as opposed to below the coal seam.

The intervenors agreed that drilling a directional well from some other surface location would be an acceptable solution, however, they believed that it would be up to the applicant to bear any increase in costs.

In summary, Alberta Power and Manalta indicated that the proposed well site is within the 10-year mine plan of both the Manalta and Forestburg mines, and therefore should be treated accordingly. Forestburg indicated that the proposed location is clearly within an area to be utilized by their mining operations in the near future, but they did not comment specifically on the relationship of the site to Manalta's 10-year mine plan.

## 5.3 The Board's Views

The Board believes that the proposed surface location is acceptable on the basis of geological and target area considerations, however, the impact of the location on mining operations must also be considered. The Board therefore concludes that a decision on the application must weigh the impact of the well on the existing mining operations against the need for the well in the location proposed.

# 6 THE NEED FOR THE WELL

## 6.1 The Applicant's Views

Chinook has obtained the rights to explore for and produce the minerals in Section 12, and stated that it should be permitted to do so. Chinook stated that it did not have an existing gas purchase contract and that there was no available market at the moment, however, the well was needed to prove up the gas reserves and thereby enhance their marketability.

The applicant also indicated that the two Crown petroleum and natural gas leases governing the mineral rights to section 12 expire on 30 May 1982 and 28 February 1983, and therefore, the well is required to ensure lease continuance.

## 6.2 The Intervenors' Views

The intervenors were unanimous in their argument that the well was not required at this time. Alberta currently has an excess of natural gas and it was their opinion that the chances of finding a market within five years were very poor. The intervenors contended that a delay in drilling the well would not have any adverse effect on the production or marketability of Chinook's gas reserves.

In regard to the question of lease continuance, the intervenors stated that Chinook is afforded ample protection since, if the application for the well licence is denied, it can apply to Alberta Energy and Natural Resources to extend the term of the lease.

## 6.3 The Board's Views

The Board notes that a mineral owner has the right to win his minerals, provided that the rights of others are also respected and there are no strong reasons to prohibit development and production. In this case, the Board believes that the drilling of a prospective oil or gas well, in LSD 14 of section 12, would have an adverse impact on the short and long term operations of the adjoining mining operations.

The Board, for geological reasons does not consider the likelihood of obtaining a commercial oil well to be great. It notes that the applicant was of the same view. Dealing with the case where gas might be found, the Board agrees with the intervenors that a gas surplus exists in Alberta at this time, and the chances for obtaining a market for this gas in the near future are extremely poor. In addition, the Board does not believe the failure to prove up the reserves under section 12 at this time would have a serious effect on the ultimate marketability of the applicant's reserves and/or property.

Additionally, because lease continuation is available, lease expiry by itself is not an adequate reason to establish the immediate need for a well licence.

In summary, because the well could have a serious adverse impact on the existing mining operations and since there is no overwhelming immediate need for this well, the Board concludes that a well should not be drilled now in the proposed location unless the impact on the mining operations can be reasonably resolved.

## 7 THE IMPACT OF THE PROPOSED WELL SITE ON THE MINING OPERATIONS OF MANALTA AND FORESTBURG

### 7.1 The Applicant's Views

Chinook indicated at the hearing that its proposed well site was outside the area encompassed by Manalta's 10-year mine plan and as a result would

have little or no impact on Manalta's mining operation. In addition, the applicant contended that in view of the limited surface lease required for a shut-in gas well (should it be productive), the well would have a very limited impact on Forestburg's mining operations. Chinook stated that it would take any reasonable measures to accommodate Forestburg.

### 7.2 The Intervenors' Views

The intervenors stated the view that the proposed well would have a significant impact on the safe and efficient completion of mining operations in its vicinity. A well in the proposed location would result in an increase in the time required to mine the area around the well, it would also result in a decrease in extraction efficiency, and an increase in the costs of the overall operation. Significant coal loss would also occur if the mining companies were forced to mine around the well.

The intervenors agreed that should the applicant temporarily abandon or suspend the well when the mining operations encountered it, there would be little or no impact on either Manalta's or Forestburg's mining operations.

### 7.3 The Board's Views

The Board believes that the proposed wellsite would have little or no impact on Forestburg's top soil and overburden removal and storage operations, which could be conducted in a safe and efficient manner even with a suitably shut-in well located between the top soil and spoil piles.

The Board concludes that the well would have a significant impact on the cost and coal recovery of Manalta's future mining operation. The Board recognizes a degree of uncertainty as to when the mining operation would reach the proposed site, but is confident that if a successful well is found, it would still be in operation at that time. No calculations were carried out to clearly define the coal loss, however, the Board believes that a substantial volume would be left in place should the coal company be forced to mine around the well. The Board is satisfied that this volume of coal would not be subsequently commercially recoverable, and that this loss coupled with the extra cost of mining around the proposed well would more than outweigh the impact on the applicant of a limited delay in drilling the well. This conclusion reflects the Board's view that any gas underlying section 12 would not be lost to the applicant as a result of a delay in drilling the well.

## 8 AVAILABILITY OF AN ACCEPTABLE PIPELINE ROUTE

### 8.1 The Applicant's Views

Chinook argued that the hearing was on an application for a licence to drill a well, and any concerns or questions regarding a possible pipeline route were irrelevant to the approval or denial of the subject application.

### 8.2 The Intervenors' Views

The intervenors agreed that the hearing was to deal with an application for a licence to drill a well, however, they contended that the application could not be considered in isolation of the need for a subsequent pipeline route. They contended that it would be inappropriate to issue a well licence knowing that there was no acceptable means of connecting the well to a market.

Manalta and Alberta Power said that they could likely agree on a pipeline route provided the applicant was prepared to abandon the pipeline when the mining operations encountered the pipeline. Forestburg indicated that in its view, there would be no acceptable pipeline route from a well completed in the proposed location.

### 8.3 The Board's Views

The Board is of the view that it must have some regard for the potential of obtaining a suitable pipeline route when considering an application for a well licence in these circumstances. The Board recognizes that an application for any pipeline route from the proposed well would likely be the subject of a subsequent hearing, but it is satisfied, on the basis of evidence presented at the subject hearing, that an acceptable pipeline route could be found. In conclusion, the Board does not believe that the question of an acceptable pipeline route is substantial enough to dictate that the well not be drilled.

## 9 ALTERNATIVE SOLUTIONS

Since the Board is of the view that the impact of a producing well on the contemplated Manalta mining operation would not be acceptable, it has examined a number of alternatives which would reduce this impact, and at the same time minimize any adverse impact on the applicant. The advantages and disadvantages for each of these alternatives, which were discussed at the hearing, are as follows:

- (a) Deny the application.

#### Advantages

- no impact on either mining operation.

#### Disadvantages

- applicant is not given the opportunity to exploit its mineral rights for an indefinite future period.

(b) Deny the application without prejudice to a subsequent application in approximately 10 years when Manalta's mining operations in the area are completed.

#### Advantages

- no impact on either mining operation.

#### Disadvantages

- applicant could lose its lease
- the applicant's ability to develop and market its gas reserves could be jeopardized
- costs of drilling and completion of a well would have increased significantly.

(c) Deny the application without prejudice to a subsequent application in approximately 2 years for a well site in the Forestburg mined out and reclaimed area.

#### Advantages

- no impact on either mining operation
- the applicant is not denied, for a significant period of time, the right to exploit its mineral rights
- the delay would not likely jeopardize the applicant's ability to market its gas reserves as soon as markets are available.

#### Disadvantages

- two year delay in proving the gas reserves of section 12
- possible impact on the value of the oil and gas property.

(d) Directional Drilling

#### Advantages

- a site could be selected that would result in no impact on either mining operation
- gas reserves underlying section 12 could be proved immediately.

#### Disadvantages

- increased risk in drilling and completing a successful well
- significantly increased cost of drilling and completing a directional well.

(e) Deny without prejudice to a subsequent application for a well site approximately 30 metres to the west of the proposed site.

#### Advantages

- removes any possibility of impact on the Forestburg mining operations
- applicant is allowed to prove its reserves immediately.

#### Disadvantages

- the adverse impact on the Manalta mining operation would not be eliminated.

(f) Approve the existing application subject to the condition that the well is abandoned when mining operations encounter the well.

#### Advantages

- the applicant is allowed to develop its mineral rights immediately
- little if any impact on either mining operation.

#### Disadvantages

- marketing of the applicant's gas could be interrupted on possibly two occasions for periods of 2 or 3 years
- increased costs associated with abandoning and recompleting the well
- some risk of losing the well completely, resulting in the drilling of a new well or loss of recoverable gas reserves.

#### 9.1 The Applicant's Views

The applicant agreed that there were probably a number of alternatives available, however, in its view as the proposed well site was clearly outside Manalta's 10-year plan the question of alternatives was academic. The applicant contended the Board's Informational Letter IL 80-14 indicated that a proposed well site located outside the limits of a 10-year mine plan would be approved unconditionally and therefore, different courses of action did not have to be considered.

Chinook stated that it was aware of Forestburg's concerns and was prepared to take any reasonable steps to accommodate Forestburg including, if necessary, moving the wellsite 30 metres to the west and plugging the well below the surface.

### 9.2 The Interveners' Views

The interveners indicated that from a mining company's point of view, the optimal solution would be to deny the application so that there was never a conflict for the full life of the mine, however, they did agree that this would be unreasonable.

In regard to denying the well for a specific period of time, the interveners agreed that although in their view, a ten year delay would not be unreasonable, the two year delay would be the more desireable alternative.

The interveners agreed that directional well would be an acceptable alternative, however, they argued that the applicant should be responsible for any increased costs. Simply shifting the well to the west would not be acceptable because, although it might relieve Forestburg's concerns, it would do nothing to alleviate the impact on Manalta's mine.

The interveners also indicated that conditioning the well licence to require removal of the well casing to the base of the coal seam when the mining operations encountered the well would be an acceptable alternative, provided that Chinook bore the costs of such an operation.

### 9.3 The Board's View

The Board appreciates that outright denial, or a denial for a period of approximately ten years, would alleviate the concerns of the mining companies, but would not adequately recognize Chinook's right to develop its minerals. Therefore, these two alternatives are not acceptable.

The Board considers that directional drilling of a well from some other surface location is not acceptable in view of the significant increase in costs and risks associated with such an operation.

The Board concludes that moving the proposed well site approximately 30 metres to the west would alleviate Forestburg's concerns, but it would do nothing to reduce the impact on Manalta's mining operation, therefore this is not an acceptable alternative.

The Board believes that a solution involving some form of well abandonment when mining operations approach the area of the well would satisfy the majority of the concerns expressed by the coal mining interests. However, this solution would involve increased risks, increased costs, and possibly two interruptions in the production of gas from the well.

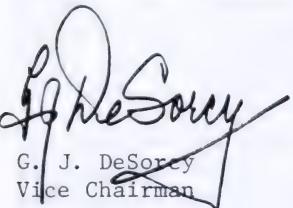
The Board believes that the most acceptable solution is to deny the application without prejudice to a subsequent application in approximately two years for a well site in the mined out and reclaimed area of the Forestburg mine. In the Board's view, this solution would not significantly affect the applicant's ability to develop and market its minerals, and at the same time it would avoid impact on the mining operations of both coal companies. Forestburg would be expected to expedite its mining and reclamation operations in the area of the potential well site.

## 10 DECISION

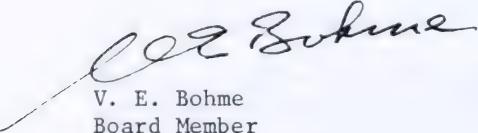
The Board is satisfied that the negative impacts on mining outweigh the need for the proposed well at this time. Accordingly, it denies the application of Chinook Management Ltd. to drill the proposed well in LSD 14-12-40-16 W4M without prejudice to a subsequent application for a well in the mined out and reclaimed area of the Forestburg mine. The Board will request Forestburg to present to it a revised mine plan to show how operations could be speeded up in the area of the potential well site with a view to reducing as much as feasible any delay in the drilling of a well in Section 12.

DATED at Calgary, Alberta, on 19 November 1980

ENERGY RESOURCES CONSERVATION BOARD



G. J. DeSorey  
Vice Chairman



V. E. Bohme  
Board Member



C. J. Goodman

C. J. Goodman  
Board Member

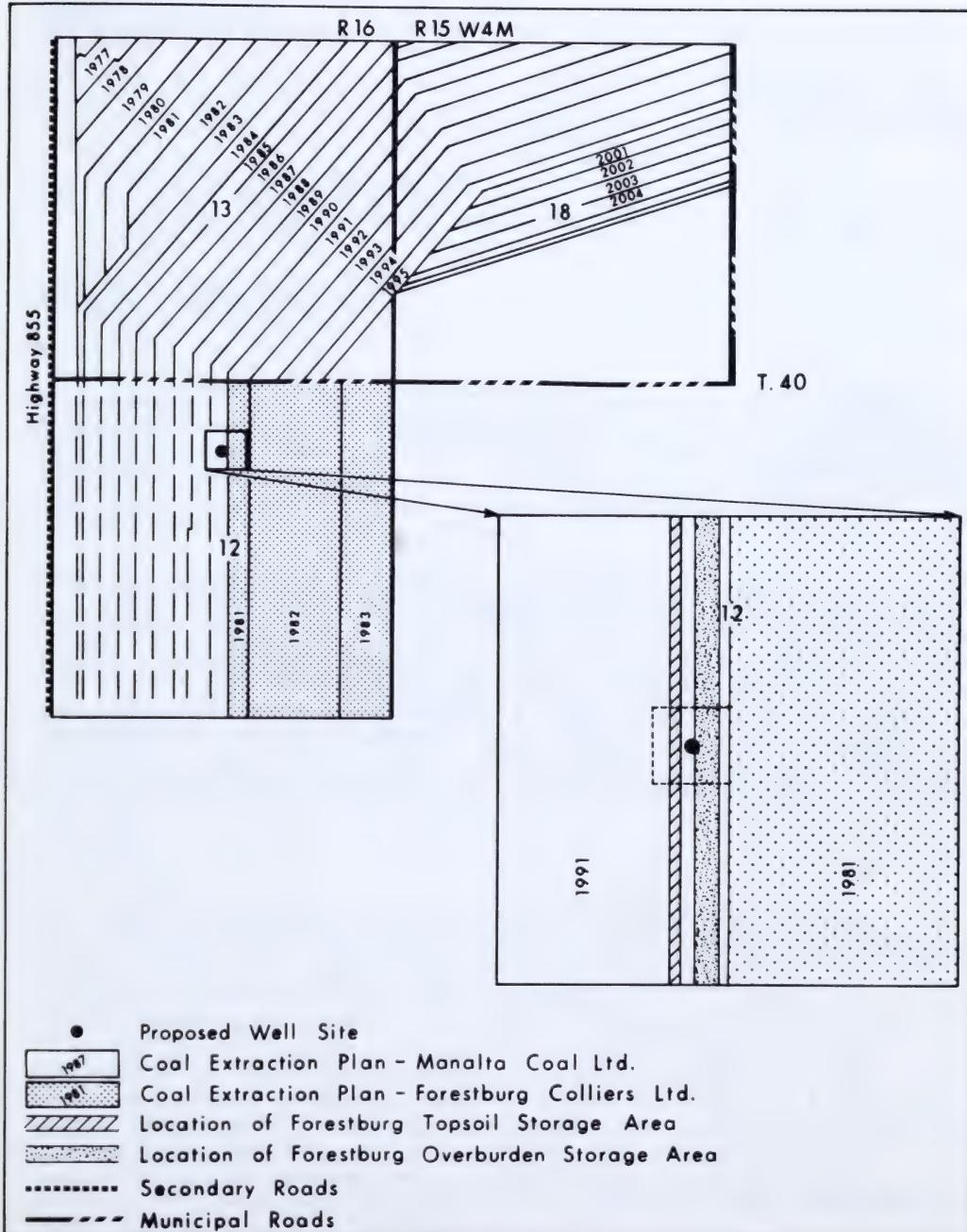


FIGURE 1 PROPOSED WELL AND SURROUNDING COAL STRIP MINES  
(based on most recent maps on file with ERCB)



ENERGY RESOURCES CONSERVATION BOARD AND  
ALBERTA ENVIRONMENT  
The Province of Alberta

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Informational Letter  
IL 80-24

TO: All Oil and Gas Operators  
and Gas Processing Consultants

SULPHUR RECOVERY GUIDELINES  
GAS PROCESSING OPERATIONS

New requirements have been set for sulphur recovery at new or expanding Alberta sour gas plants. The revised guidelines result from continuing investigations and communications involving the federal and provincial governments and the industry. They supersede the requirements previously established in 1971 as they are set out in the Board's Informational Letter IL 71-29 and in applicable parts of IL-OG 74-5.

While the new recovery efficiency requirements will be generally applicable, some variance may be appropriate in particular circumstances. For example, where there are overriding local environmental considerations, sulphur recovery may be required at small plants having a sulphur inlet rate of less than 10 tonnes per day (t/d). At plants with severe design constraints or operating conditions, a modest reduction in the required recovery level may be permitted if this appears to be environmentally acceptable. A decision to deviate from the normal requirement would not be made without opportunity for the input of persons who may be adversely affected.

New Plants

For plants commencing construction after 1 December 1980 and with approved inlet rates exceeding 10 t/d of sulphur, the expected minimum sulphur recovery for normal plant operating conditions shall be determined to the nearest 0.1 per cent from Figure 1. Figure 1 is intended to be applicable to plants processing good quality acid gas (i.e. acid gas containing more than 40 per cent hydrogen sulphide). An operator may apply for some relaxation if poor quality acid gas is to be processed. For small plants to be emitting less than 3 t/d of sulphur and processing acid gas barely within the good quality range, some relaxation may be permitted having regard for the cost and complexity of the equipment which would be required to achieve the recovery efficiency indicated in Figure 1. These and other exceptional cases will be considered individually.

The gas processing scheme approvals issued by the Board will stipulate a required quarterly average recovery of 0.3 per cent less than the recovery determined from Figure 1. This difference allows for operating periods during which the plant is experiencing start-ups and shut-downs or abnormal operating conditions.

#### Plant Expansion, Modification, or Life Extension

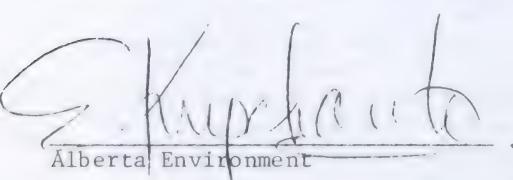
Plants being expanded or significantly modified will be assigned a sulphur recovery requirement on an individual basis having appropriate regard for the new requirements and such factors as the nature and extent of the expansion, environment protection, economics, and the forecast sulphur inlet rates. Similarly, where substantial new reserves of sour gas are to be processed in, and thus would extend the life of, a plant whose recovery efficiency was established under previous guidelines, the plant's sulphur recovery requirement would also be reviewed having regard for the same factors.

#### Existing Plants

Existing plants not included in the above categories remain subject to the sulphur recovery requirements stipulated in the respective approvals. As these stipulated requirements are expressed on a quarterly average basis, they are not to be reduced by the 0.3 per cent allowance mentioned above under the heading "New Plants".

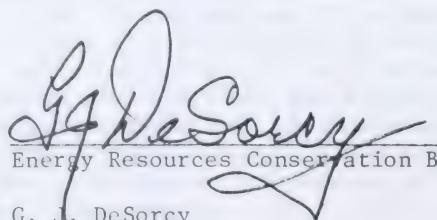
An operator of an existing plant which is receiving gas from fields undergoing a decline in deliverability may apply for a reduction in the recovery efficiency requirement. The decision on an application of this type would be based on such relevant considerations as environmental impact, sustainable plant throughput, plant turndown ratio, and sulphur recovery efficiency experience at the plant.

ISSUED at Calgary, Alberta on 4 November 1980.



E. E. Kupchanko  
Alberta Environment

E. E. Kupchanko  
Assistant Deputy Minister



G. J. DeSorcy  
Energy Resources Conservation Board

G. J. DeSorcy  
Vice Chairman

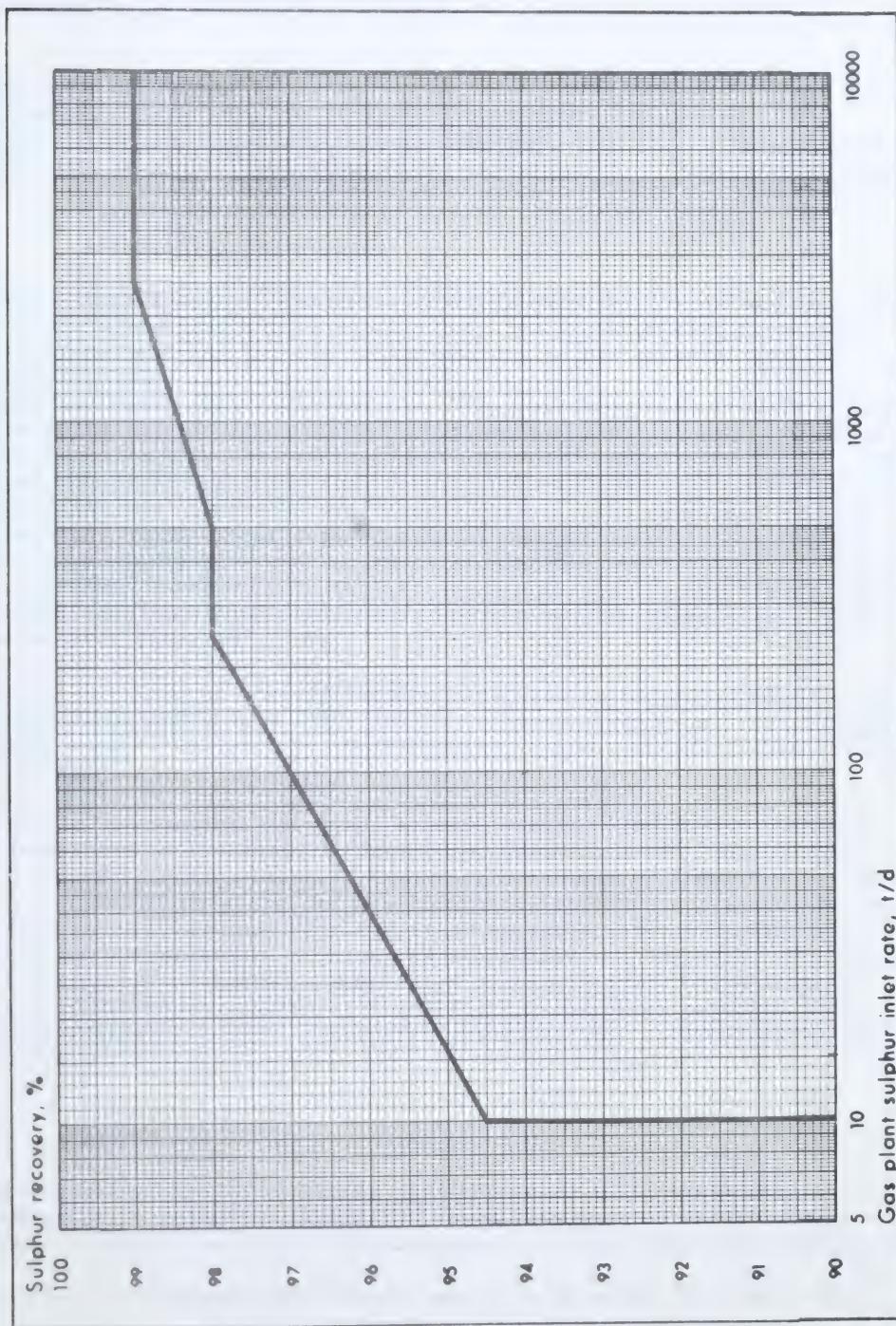


FIGURE 1 ALBERTA GAS PLANT - SULPHUR RECOVERY REQUIREMENT

<sup>1</sup> At normal operating conditions. Deduct 0.3% for quarterly average requirement.



*File No. 103*

ENERGY RESOURCES CONSERVATION BOARD  
Calgary Alberta

DECISION REPORT

CELANESE CANADA INC. AND CELANESE CORPORATION  
APPLICATION TO USE NATURAL GAS AS FEEDSTOCK  
AND FUEL TO MANUFACTURE METHANOL AT CLOVER BAR

Decision 80-25  
Application 800124

1 APPLICATION AND HEARING

Celanese Canada Inc. (Celanese) applied, pursuant to section 42 of The Oil and Gas Conservation Act (the Act) for an industrial development permit authorizing the use of natural gas as raw material and fuel in the production of methanol in a new unit to be constructed on its existing plant site at Clover Bar. The requested permit would authorize the annual use of  $770 \times 10^6$  m<sup>3</sup> of gas as raw material and  $30 \times 10^6$  m<sup>3</sup> of gas as fuel in the production of  $700 \times 10^3$  tonnes of methanol. Gas used as raw material and fuel for the proposed methanol unit would be obtained from Alberta natural gas suppliers. The applicant expects that as much as 75 per cent of initial production would be exported to the United States and Pacific Rim countries, with the balance going to Canadian markets including its own on-site derivative plant. The permit term requested is 20 years commencing with plant start-up on or about 1 July 1982.

Public hearings of the application were held in Edmonton, Alberta on 2, 3, 4, 5, and 6 June 1980, and in Calgary, Alberta on 4 and 5 October 1980, with V. Millard, Dr. N. Berkowitz, P.Eng., and H. J. Webber, P.Eng., sitting.

Alberta Gas Chemicals Limited, Alberta Gas Ethylene Company Limited, Association of Professional Engineers, Geologists and Geophysicists of Alberta, Chevron Standard Limited, Norcen Energy Resources Limited, R. K. Dixon Engineering Services Limited, Sultana Corporation, Borden Chemical, and Reichhold Limited filed interventions. The City of Medicine Hat presented submissions at both of the hearings. The County of Strathcona presented a submission at the initial hearing and the City of Edmonton appeared at the initial hearing for purposes of cross-examination only. The participants at the hearings are listed in Table 1.

2 ISSUES

Section 42 of the Act provides that the Board shall not grant an industrial development permit "unless in its opinion it is in the public interest to do so, having regard to, among other considerations

(a) the efficient use without waste of the energy resource, and

TABLE 1 THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Celanese Canada Inc. (Celanese) D. G. Hart	B. F. MacDonald N. Martin J. K. Lambie, P.Eng. J. Kuziak, P.Eng. P. H. Spitz of Chem Systems Inc. M. A. Kane of Hu Harries and Associates Ltd.
Alberta Gas Chemicals Ltd. (AGCL) J. D. Major	Dr. W. Blackman of University of Calgary G. J. Demke of Foster Research A. E. Egglestone, P.Eng. K. H. MacRae Dr. C. A. Stokes of The Stokes Consulting Group J. Wasserman of Freeman, Meade, Wasserman & Schneider L. S. Heaton of Fluor Canada Ltd. B. Friedenberg of Applied Economic Research Associates Y. Ikegaki of Mitsui and Co. Ltd.
Alberta Gas Ethylene Company Ltd. P. T. McCarthy	
Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA) N. A. Lawrence, P.Eng.	
Chevron Standard Limited R. H. McCallum R. A. Pashelka	
Norcen Energy Resources Ltd. D. S. Morgan R. Erdman	

TABLE 1 cont'd THOSE WHO APPEARED AT THE HEARING

<u>Principals and Representatives (Abbreviations Used in Report)</u>	<u>Witnesses</u>
R. K. Dixon Engineering Services Ltd. R. K. Dixon, P.Eng.	
Sultana Corporation E. L. Schmidt	
City of Medicine Hat M. Reinhardt	
City of Edmonton W. Mis	
County of Strathcona E. Haas	Dr. M. Katz of University of Toronto
Energy Resources Conservation Board staff M. J. Bruni J. D. Dilay, P.Eng. R. Funk K. Johnston	

(b) the present and future availability of hydrocarbons in Alberta."

Having regard for the requirements of the statute, the Board believes the primary issues are:

- (a) whether gas is an appropriate feedstock and fuel for the proposed plant, and if so, whether it would be efficiently used, and
- (b) the applicant's gas requirements and the availability of gas in Alberta.

Additional issues raised at the hearing and which, in the Board's opinion, are of major importance respecting the application:

- (c) the markets for methanol to be produced at the proposed plant, and
- (d) the impact of the proposed project on the Alberta economy and the methanol plant currently operating at Medicine Hat.

3 APPROPRIATENESS OF GAS AS FEEDSTOCK AND FUEL FOR THE PROPOSED PLANT AND THE ENERGY EFFICIENCY OF THE PROPOSED PLANT

3.1 Appropriateness of Gas as Feedstock and Fuel in the Manufacture of Methanol

In support of its choice of natural gas as feedstock and fuel for the proposed methanol plant, Celanese submitted that it had considered coal as an alternative, but found it economically unacceptable for its purposes.

The Board agrees that current Alberta gas pricing policies, and the fact that Celanese intends to build the proposed facility at its existing complex, still favour gas as a feedstock and fuel for a methanol plant scheduled to begin operations in 1982. However, in view of the projected growing disparity between gas and coal prices in Alberta, and of commercial coal-based petrochemical developments in other jurisdictions, the Board reiterates its view, expressed in an earlier report<sup>1</sup>, that future grassroots facilities for manufacture of methanol and similar petrochemical products may prove to be more advantageously based on coal than on gas. The Board would encourage more serious consideration of this matter.

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1 In the Matter of an Application of Alberta Gas Chemicals Ltd.  
ERCB Report 76-E, July 1976.

### 3.2 Efficient Use of Gas

The Board notes that Celanese would use the latest ICI low-pressure process for methanol manufacture from natural gas. It is satisfied that this represents up-to-date technology and would result in an efficient use of gas. In addition, the Board notes that the unit would interact with existing units at the site through steam transfer for example, and therefore, energy efficiency would be further promoted in this way.

### 4 CELANESE'S GAS REQUIREMENTS AND THE AVAILABILITY OF GAS IN ALBERTA

Celanese's annual gas requirements for the proposed methanol plant would range between 670 million and 800 million cubic metres per year. Approval for consumption of the higher quantity was requested. This higher quantity, if used, would total 16 billion cubic metres of gas over a permit term of 20 years. Gas supplies would be arranged for Celanese by Northwestern Utilities Limited. Celanese stated that approximately 75 per cent of its gas requirements would be contracted with small producers but that no contracts had yet been finalized. Celanese stated that as a general rule it would seek contracts of greater than 10 years' duration. However, it would also want some shorter term contracts to allow phase-in of its own developed gas should that be desired.

The Board is satisfied that sufficient gas will be available in Alberta for the proposed use over the requested permit term. If a permit were issued, Celanese would be required to satisfy the Board with respect to satisfactory arrangements for the supply of gas for the project.

### 5 MARKETS FOR METHANOL

#### 5.1 Views of Celanese

The applicant presented its assessment of world demand and supply for methanol during the 1980s. It contended that methanol demand is entering a buoyant period and that by 1981 there will be a deficit in world capacity which will continue through to 1982 even with the additional plant capacity currently under construction by AGCL, and planned by Celanese and Ocelot. The latter project has been announced as a 1200 tonne per day plant to be constructed at Kitimat, British Columbia. Further new capacity that has been announced for 1983 was viewed by the applicant as creating a modest world wide over supply situation if all of the plants were actually constructed. Celanese suggested, however, that some of these plants would likely be delayed and thereby the potential over supply situation would be avoided. The applicant also suggested that approval and construction of its project could discourage future expansion by other producers. In the applicant's view, AGCL facilities at Medicine Hat will not be shut down because of inadequate markets.

In presenting its supply estimates, Celanese indicated that it had incorporated an allowance for unscheduled interruptions in supply due to plant failures, etc. The allowance was 10 per cent applied to the sum of the annual plant capacities. In estimating demand, it relied on forecasts made by Chem Systems Inc. but emphasized that these estimates did not allow for methanol demand in the fuel markets, such as an extender to motor gasoline and for the generation of electric energy. Mr. Spitz, on behalf of Celanese, made reference to recent developments in Germany where methanol is currently being blended with gasoline and suggested that this type of demand could very well develop in North America.

### 5.2 Views of the Intervenors

AGCL disagreed with the applicant's position respecting the future demand and supply for methanol. Its detailed market forecast indicated substantial surplus capacity in those markets reasonably accessible to Canadian producers and it projected a glut of methanol in world markets during the 1980s. On the basis of data Celanese had presented at the hearing, AGCL estimated the surplus would continue until 1988, whereas based on its own projections, the surplus would continue until 1991. In both cases the supply forecasts assumed that no additional plants would be constructed after 1985. On the basis of these findings, it stated that "if the proposed Celanese plant is approved, the resulting over supply of methanol in this market area will force AGCL to shut down its two existing plants in 1983 and following".

In preparing its supply estimates, AGCL did not make any specific allowance for unscheduled plant outages and instead contended that the sum of the plant annual capacities provided a realistic estimate of supply. The AGCL supply estimate assumed that most of the plants announced in the press would be constructed. With respect to the fuel demand for methanol, Dr. Stokes, testifying for AGCL, indicated that in his view those markets would not be realized until large coal-based methanol plants are constructed during the late 1980s.

### 5.3 Views of the Board

The Board has carefully reviewed the evidence respecting future outlook for methanol demand and supply. Recognizing that both Celanese and AGCL are knowledgeable and experienced in the marketing of methanol, the Board concludes that the widely differing views arise from different perceptions of market outlook. In the Board's view this is not too surprising in view of the many uncertainties that currently prevail in world energy demand and supply matters. Indeed, this appears to be a period where it is especially difficult to predict future demand for specific products because of the many uncertainties in world oil supply, the rapidly changing fossil hydrocarbon price structure, and the desire of the industrialized nations to ensure reasonable protection against uncontrollable external events.

In examining the evidence respecting methanol supply, the Board believes that some allowance must be made for unscheduled plant outages, but concludes that the 10 per cent allowance adopted by Celanese is too high and that a more appropriate adjustment would be 5 per cent. It also recognizes that there is considerable uncertainty with respect to whether or not all of the plants announced for construction will actually proceed or perhaps of more importance, whether they will be completed at the announced dates. The Board expects that some delays may well occur depending upon market outlook and that consequently the actual supply may turn out to be less than forecast by AGCL.

With respect to methanol demand, the Board agrees with both Celanese and AGCL that methanol probably will become increasingly important as a fuel supply. It concurs with Celanese that these markets will develop gradually over the next few years and with AGCL that a massive switch to methanol fuel (e.g. by utility companies presently relying on fuel oil) will not start until the late 1980s, when large scale coal-based plants are expected to come on stream and to offer users a large secure supply. In the intervening years, demand for methanol fuel, whether as a gasoline extender or as an industrial fuel, is likely to be met by conventional suppliers.

The Board emphasizes that technical options for displacing imported oil by fuel-grade methanol could, of course, in the longer run operate in the reverse direction, and impact adversely on "conventional" methanol producers. Deterioration of present international oil supply patterns could quite conceivably prompt accelerated development of large coal-based capacity. And because such plants may have advantages from economies of scale they could invade methanol markets merely by adding methanol purification trains. However, the impact of such developments - and their particular effect on Canadian methanol producers - cannot at present be assessed with any confidence; and any threat they pose would perhaps, in any event, be no different than competition in the market place which all industrial ventures must contemplate and cope with as it arises.

Notwithstanding the foregoing comments on supply and demand, the Board expects that there will be some over capacity during the first few years after the Celanese plant and the new AGCL facilities commence production. Indeed, some over capacity almost seems inevitable because of the substantial addition to supply anticipated during the 1983-85 period. The total addition to supply in those areas supplied by Canadian production will be some two million tonnes per year even if the proposed Celanese plant is not proceeded with. The Board notes that AGCL accounts for about 40 per cent of this increase in capacity - half of which will occur at Medicine Hat and the other half in New Zealand. It is possible, however, that all of this increased capacity will be required, even in the initial years, if there is a major disruption in world oil supplies and as a consequence methanol requirements for fuel increase dramatically. Even if this does not occur, however, the Board expects that the over capacity would be absorbed by the growth in demand within a few years.

The Board has also reviewed the evidence respecting how any excess capacity might impact on AGCL or Celanese or indeed any of the methanol producers supplying markets served by Canadian production. It has reviewed the estimates presented by both parties at the hearing but in view of all the market uncertainties is not convinced that either projection would actually materialize. Having regard for the competitive position of Canadian producers in methanol markets, the Board believes that Alberta plants could fare relatively well. Additionally, much may depend on how and where new market growth occurs. While the Board does not believe that the kind of outlook forecast by AGCL is likely to occur, it does recognize that it is a possibility. The Board has, therefore, decided to adopt as a "worst case" scenario the assumption that some AGCL facilities may be shut in during the first few years in considering the impact which the proposed Celanese plant would have on AGCL. This matter is discussed in section 6.

In summary, the Board agrees that the evidence suggests that methanol demand is likely to increase significantly during this decade and that Alberta producers, with favourable natural gas prices, are in a good position to compete in those markets. It recognizes that notwithstanding the substantial demand growth for the first few years following completion of the proposed Celanese and other plants there may be some excess capacity in the industry, and while unlikely, a portion of the AGCL facilities in Medicine Hat could be forced to operate at reduced rates for a few years.

## 6 ECONOMIC ASSESSMENT

### 6.1 Views of Celanese

As shown in Table 2, Celanese estimated that revenue from sales of its methanol production between 1982 and 2002 will amount to \$7938 million (in as spent dollars). After deducting expenses, the project was forecast to generate \$1246 million in corporate taxes and an after-tax net income of \$1722 million.

A multiplier effect of two was applied to local expenditures for goods and services. Thus, Celanese calculated that the effect of its proposed project, in isolation, would be to increase Alberta expenditures by \$5460 million. However, the negative effects of the proposed project on AGCL would reduce this impact to \$5226 million.

Celanese contended that the project would form an integral part of its Clover Bar petrochemical complex which presently employs some 600 people. Celanese stated that if the methanol plant does not proceed, the components of the existing complex may be shut down as they become obsolete.

Celanese recognized that its plant would oblige AGCL to divert some future methanol sales from Canadian to foreign markets, and that this diversion would result in a somewhat lower netback. Celanese

estimated that the concomitant reduction in revenue would be \$117.3 million (as spent dollars) and, consequently, AGCL's return on assets would decline from 30.4 per cent to 29.5 per cent. Celanese did not believe this potential impact to be significant, nor did it believe that AGCL would have to shut down any of its capacity in Medicine Hat.

In its benefit cost evaluation (undertaken from the provincial perspective), Celanese equated gross benefits with the sum of total revenue and capital investment from non-Alberta sources. Celanese then subtracted what it considered to be gross costs; i.e. capital expenditures, production costs, and other ex-Alberta payments or expenditures. The residual was adduced to be a net benefit to Alberta, and included provincial corporate taxes, municipal taxes, 50 per cent of federal corporate taxes (assuming that one-half of federal taxes would be requitted to Alberta), and 67 per cent of corporate profits (based on Celanese's forecast of reinvested earnings in Alberta). In addition, the accounting format that was adopted had the effect of ascribing as a net benefit all of the initial capital expenditure. A summary of Celanese's estimates of benefits and costs is reproduced in Table 3.

The net benefit of the project alone was thus estimated to be \$864.9 million (1980 dollars); the impact on AGCL was set at \$27.3 million; and the resulting net benefit was estimated to be some \$837.6 million.

## 6.2 Views of the Intervenors

AGCL contended that, if the Celanese plant were to proceed, not only would its production be displaced out of the Canadian market, but also that half of its plant would be shut down for the 1983-87 period. AGCL calculated a direct Alberta income loss of some \$204.3 million (in 1980 dollars), of which \$194.6 million would occur during 1983-87. Its calculation of direct income loss accounted for decreases in: natural gas expenditures; labour expenditures; operating expenditures (82 per cent Albertan); provincial taxes; federal taxes (50 per cent ressent in Alberta); and 67 per cent of net income. The 67 per cent of net income was included to reflect the Alberta equity owners share of net income. AGCL assumed a multiplier of two and calculated a direct plus indirect impact of \$408.6 million (1980 dollars).

AGCL estimated that between 53 and 61 direct jobs would be lost due to the partial plant shut down over the 1983-87 period. The decline in direct plus indirect employment was estimated at some 191 to 204 jobs over the period. AGCL estimated that the direct reduction in wage expenditures would be \$7.6 million with a further \$7.4 million decline for operating inputs.

In its benefit cost evaluation of the adverse impact of the Celanese plant, AGCL assumed that net costs to Alberta would include a reduction of: corporate provincial taxes paid; 50 per cent of corporate federal taxes paid; and 67 per cent of the after-tax earnings. AGCL noted that it used 50 per cent of federal taxes to be consistent with Celanese.

(With respect to previous estimates of federal taxes remaining in Alberta, Mr. Demke, on behalf of AGCL, indicated that in those studies he used a value which reflected the Alberta portion of the total Canadian population. Even though estimation of the appropriate magnitude is very difficult, Mr. Demke believed that Celanese's estimate of 50 per cent was excessive.)

AGCL further suggested that the portion of after-tax income that accrues as a net benefit to any region or country depends on the level of equity participation by residents of the region or country under consideration.

AGCL estimated the present value of the total social cost to the province to be \$28 million (1980 dollars).

M. Reinhardt, the Mayor of Medicine Hat, expressed mixed emotions concerning the Celanese proposal. While he was reluctant to interfere with free market forces, he emphasized that a new methanol plant at Clover Bar could pose a threat to AGCL's expansion in Medicine Hat, which could result in a loss of future growth to the city. In view of AGCL's marketing problems in the U.S., Mayor Reinhardt felt there was some doubt that both the Celanese and AGCL expansions could coexist. He contended that since AGCL represents a significant industrial base in Medicine Hat, and since the government has adopted a policy of decentralized industrial development within the province, serious consideration should be given to any event that might jeopardize AGCL's position.

### 6.3 Views of the Board

The Board has reduced estimated Celanese revenues to reflect its assumption that Celanese will operate at less than full capacity over the first few years. Revenue from sales is estimated at \$7761 million (as spent dollars). The project is forecast to generate total taxes of \$1043 million, and an after tax net income of \$1442 million. The Board has incorporated Celanese's assumptions respecting the proportion of project expenditures that would be made in Alberta. The Board has applied a multiplier of two, and calculates a total direct and indirect impact on Alberta of \$1076 million (as spent dollars). The Board recognizes that a multiplier of this magnitude in a fully-employed economy implies increased migration to Alberta.

In its assessment of the proposed Celanese project, the Board has conducted its benefit cost analysis from the provincial perspective, and has employed assumptions that are consistent with that perspective. In several instances these differ from the assumptions advanced by Celanese.

The Board has considered the opinions of the witnesses with respect to requitted federal corporate income taxes. The Board believes that the sources of federal corporate income taxes are irrelevant to the nature and location of federal government expenditures. Thus, if some

level of federal corporate income taxes did not materialize from a specific project in Alberta, the federal government would not reduce its expenditures in Alberta proportionately (and vice versa). The Board believes that, in a broad sense, Albertans can derive benefits from federal programs in much the same way as do other Canadians. Therefore, the Board has assumed that federal corporate income taxes will finance programs that will benefit Albertans, regardless of the actual location of the expenditures. The Board assumed that Alberta's share of the benefits will be proportionate to Alberta's share of the nation's population, which is currently about 10 per cent.

The Board does not consider a capital expenditure to be a benefit, in and of itself. However, Alberta's share of the income generated by capital is clearly a benefit. Alberta's share of such income is measured by provincial and municipal tax revenue, and that portion of after tax net income that accrues (in the form of dividends or retained earnings) to resident owners of a corporation's equity. Interest payments to bond holders are considered benefits as well, where it can be demonstrated that debt is raised from Albertan savings. The Board assumes that the project would be financed with 50 per cent debt and 50 per cent equity, thereby requiring \$115.5 million (1980 dollars) of equity. Albertans, who own 3.5 per cent of the corporation's outstanding equity, are assumed to contribute their share to this project - \$4.1 million. This outlay of Albertan savings then, is deemed a cost for which Albertans receive 3.5 per cent of the project earnings. A comparison of the effects of the different assumptions utilized by Celanese and the Board is presented in Table 3.

As indicated in section 5, the Board recognizes the many uncertainties respecting the market outlook for methanol. For the purpose of estimating the economic impact of the proposed Celanese plant and its adverse impact on AGCL operations, the Board has developed what it believes to be a "worst case" scenario. For this case, the Board has assumed that Celanese would operate at 70 per cent of capacity over the 1983-85 period, and would then increase to 100 per cent of capacity by 1987. The Board has adopted in part AGCL's estimate for potential adverse impact on its operations, in the belief that this would be the most severe case that could reasonably be anticipated. The Board believes that within this pessimistic scenario, AGCL may shut-in one of its two existing units for short periods during the initial three years of operation of the proposed Celanese plant. The Board believes that continuation of favourable prices paid by the Canadian petrochemical industry for feedstock, relative to equivalent world prices, should permit access to most international markets.

The Board recognizes that from a broader perspective than the province the proposed project provides additional benefits such as the remaining portion of federal corporate taxes and a much greater share of the project's earnings. However, it is also recognized that there may well be additional costs associated with these benefits.

The results of the Board's benefit cost evaluation are shown in Table 4 and indicate that the project would generate a positive net benefit to the province at all levels of discount rates considered. The Board believes these calculations incorporate greater costs than would in fact occur.

Celanese also evaluated the merits of its proposed project by comparing the benefits that would be obtained from the sale of the gas to the proposed plant versus the benefits from the sale of the gas in ex-Alberta markets. It assumed that it would purchase the gas at the Alberta border price and that sales in ex-Alberta markets would be either at that price or the export price. It also assumed that the out-of-province sales would commence in 1982-83. The Board believes some of these assumptions are unrealistic. The evidence indicates that Celanese expects to purchase its gas supplies at less than the border price. However, having regard for the substantial volumes of gas currently shut-in in the province, the Board does not believe that sales in ex-Alberta markets would occur for several years. These factors have offsetting effects and, in general, the Board agrees with the applicant that under expected conditions the future sales alternative would not provide greater benefits to the province than current use of the gas in the production of methanol.

## 7 OTHER MATTERS

### 7.1 Price to be Paid for the Gas

Celanese submitted that the actual cost of gas for the proposed project could not be provided, since it had not yet completed all of the arrangements for purchasing its feedstock and fuel requirements. Celanese stated, however, that the economic viability of the project would depend on a continuance of current federal and provincial policy guidelines relating the price of gas in Alberta to the cost of crude oil in Toronto and Chicago. Celanese stated that it had calculated the economics of the project on the basis of publicly available schedules of the Alberta border prices for gas, and on its projection of energy prices over the requested permit term. It also stated that with regard to gas price escalation it expected, at the time it was making the calculations, that the gas price would approach 85 per cent of parity with crude oil. Celanese submitted that present Alberta government policy and legislation permits a "free market" with respect to prices paid for gas used within the province, and that if all or part of the gas supply can be obtained at lower than the prevailing border prices it would enter into contracts with producers willing to supply gas under such terms.

R. K. Dixon of R. K. Dixon Energy Services Limited raised the matter of prices paid by industrial versus domestic gas users in Alberta. Dixon's submission further commented that public statements credited to Alberta Government Ministers maintained that Alberta chemical plants do not need

TABLE 2 CELANESE AND BOARD ESTIMATES OF THE INCREMENTAL IMPACT  
OF THE PROPOSED CELANESE PROJECT 1980 - 2002  
millions of dollars

	1	2	3	4
	<u>Celanese Estimate</u>		<u>Board Estimate</u>	
	1980	As Spent	1980	As Spent
	Dollars	Dollars	Dollars	Dollars
Revenue from Sales	2 713.7	7 938	2 593	7 761
Expenditures				
Construction Costs	233.2	255	233	255
Operating Costs	192.6	590	205	590
Interest	88.0	166	70	122
Municipal Taxes	49.2	114	48	114
Feedstock	1 346.4	3 845	1 422	4 195
Total Costs	1 909.4	4 970	1 978	5 276
Operating Income	804.3	2 968	615	2 485
Before Tax				
Income Taxes				
Provincial	98.0	326	74	273
Federal	275.8	920	209	770
Total	373.8	1 246	283	1 043
Net Income After Tax	430.5	1 722	332	1 442

Incremental Alberta Impact

Direct

Construction Costs	100	100
Operating Costs	412	412
Net Income	1 154	34
Taxes	1 064	350
Raw Material	-	-
Total Direct	2 730	862

Adverse Impact on AGCL	(177)	(324)
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Total	2 613	538
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Indirect	2 613	538
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TOTAL	5 226	1 076
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TABLE 3 CELANESE AND BOARD CALCULATIONS OF NET  
BENEFITS TO ALBERTA FROM CELANESE PROJECT  
Millions of undiscounted 1980 dollars

	Celanese	Board
Alberta's Share of After-Tax Profits <sup>a</sup>	347	14
Federal Corporate Tax Benefit <sup>b</sup>	138	21
Provincial Corporate Taxes <sup>c</sup>	98	74
Municipal Taxes	49	48
Investment from Outside Alberta	233	0
Less: Impact on AGCL	(27)	(39)
Net Benefit	838	118

- a The benefit calculated by Celanese was based on the assumption that 67 per cent of the project's retained earnings would be reinvested in Alberta. The Board based its calculation on the level of resident ownership of the project, which amounts to some 3.5 per cent of the corporation's outstanding equity.
- b Celanese assumed that 50 per cent of federal corporate taxes would be requitted to Alberta as a net benefit. The Board assumed that Alberta's share of the benefits would be proportionate to Alberta's share of the nation's population, currently about 10 per cent.
- c The Board was less optimistic than Celanese respecting the project's potential revenue. Thus, the Board forecast lower provincial corporate taxes than did Celanese.

TABLE 4      BOARD ESTIMATE OF CELANESE PROJECT NET  
BENEFIT TO ALBERTA, 1980 - 2002  
millions of 1980 dollars

	1	2	3	4
	<u>Discount Rate</u>			
	0%	5%	10%	15%
Celanese Benefit	157	78	42	23
AGCL Cost	39	27	20	16
Net Benefit	118	51	22	7

inexpensive gas to be economically viable, but rather need a guaranteed supply as offered in Alberta.

In its appraisal of the economic impact of the proposed project on Alberta the Board used Alberta border prices. In addition, it also considered in a general manner, the benefits of using the gas for the production of methanol at a price less than the border price as compared to the alternative of selling an equivalent volume of gas in markets outside the province. The Board's conclusions may be found in section 6.

#### 7.2 Upgrading of Resources

The applicant submitted that it would look into the feasibility of additional investment in Alberta to upgrade the methanol produced into products such as acetic acid and vinyl acetate. The Board notes that Celanese did not indicate a tentative timetable for such additional investment.

#### 7.3 Manpower Requirements

The applicant forecasted that labour requirements for the plant construction would peak at 1150 persons in mid-1981, and that 57 persons would be employed during the operations phase of the project. The Board notes that delays in the start of construction would alter the time schedule of requirements for specific skill categories submitted by the applicant.

#### 7.4 Required Government Support

The applicant submitted that no direct government financial support is required for the project, but that economic viability of the project is predicated on continuing favourable gas prices.

#### 7.5 Social Impact

The Board has considered the social impact of a possible decrease in projected employment levels at the AGCL methanol plant in Medicine Hat, should it be necessary for AGCL to reduce its production levels due to inadequate market demand. It believes that while some reduction in anticipated manpower requirements might be necessary for a few years after the proposed Celanese plant were to commence production, any adverse social impact on the City of Medicine Hat would be minimal.

#### 7.6 Environmental Impact and Public Safety

With regard to the transportation of methanol through the City of Edmonton, the applicant testified that it participates in a program sponsored by the Canadian Chemical Producers Association. This program enlists the co-operation of the Association members and co-ordinates their efforts to provide technical advice and assistance to police, fire, and

civil protection authorities in the event of highway, rail, and marine accidents involving chemical products. The applicant stated also that the Alberta Regional Control Centre for this program is made up of selected personnel located on its own Clover Bar plant site. The applicant estimated that about one-quarter of the 30 methanol tank cars loaded per day would pass through the Canadian National Railway's Calder Yards. The Board notes that the City of Edmonton, which raised the matter, withdrew its intervention subsequent to the hearing.

With regard to environmental matters, the applicant stated that it is working on an intermittent noise problem which emanates from its oxygen plant. The applicant also outlined efforts which it is making to reduce odourous emissions. The Board is satisfied that adequate public safety and environmental standards would be maintained by Celanese in all aspects of the proposed plant operation.

#### 7.7 Participation by Citizens

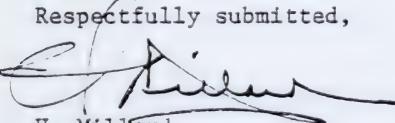
Celanese submitted that ownership in the proposed facility would be available to Albertans and other Canadians through acquisition of shares of Celanese Canada Inc., which are traded on Canadian stock exchanges.

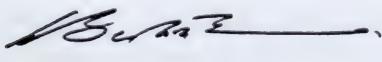
#### 8 DECISION

In light of its findings and responsibilities under the Act, the Board is prepared, with the approval of the Lieutenant Governor in Council, to grant the application. The permit would be in the form shown in the Appendix, subject to all of the terms and conditions contained therein and to any conditions imposed by the Lieutenant Governor in Council.

ISSUED at Calgary, Alberta on the 20th day of November 1980.

Respectfully submitted,

  
V. Millard  
Chairman

  
N. Berkowitz  
Vice Chairman

  
H. J. Webber  
Acting Board Member



IN THE MATTER of the Oil and Gas Conservation Act, being chapter 267 of the Revised Statutes of Alberta, 1970, and

IN THE MATTER of an industrial development permit to Celanese Canada Inc. authorizing the use within Alberta of gas produced in Alberta for the production of methanol

INDUSTRIAL DEVELOPMENT PERMIT NO. CCL 80-1

WHEREAS Celanese Canada Inc. has applied to the Energy Resources Conservation Board for an industrial development permit, pursuant to section 42 of The Oil and Gas Conservation Act, authorizing the use of gas produced in Alberta for the production of methanol in Alberta; and

WHEREAS the Board, upon inquiry into the application, is of the opinion that the granting of this industrial development permit for the use of gas as raw material and fuel in the production of methanol is in the public interest having regard to, among other considerations, the efficient use without waste of energy resources and the present and future availability of hydrocarbons in Alberta; and

WHEREAS the Lieutenant Governor in Council, by Order in Council numbered O.C. , and dated , has authorized the granting of the permit.

THEREFORE, the Energy Resources Conservation Board, pursuant to the provisions of section 42 of The Oil and Gas Conservation Act, being chapter 267 of the Revised Statutes of Alberta, 1970, hereby grants an industrial development permit to Celanese Canada Inc. (hereinafter called "the Permittee") .

authorizing the use of gas as raw material and fuel in the production of methanol subject to the regulations and orders made pursuant to the Act and to the terms and conditions prescribed in this permit as follows:

1. This permit is for the use by the Permittee of gas as raw material and fuel in the production of approximately 700 000 tonnes per year of methanol, generally as described in the application dated February 21, 1980.

2. The plant facilities at which methanol will be produced shall be located in Section 17, Township 53, Range 23, West of the 4th Meridian.

3. Subject to the conformity by the Permittee with the terms and conditions hereof, this permit shall be for a term commencing on the date hereof and ending on June 30, 2002.

4. The quantity of gas that may be used in the industrial operation referred to herein shall not exceed

(a)  $770 \times 10^6$  cubic metres per calendar year as raw material and  $30 \times 10^6$  cubic metres per calendar year as fuel, or

(b)  $16 \times 10^9$  cubic metres during the term of the permit referred to in clause 3.

5. The quantities of gas for the purpose of this permit shall be on the basis of a gas free of water vapour and having a higher heating value of 37.4 megajoules per cubic metre.

6. All gas used in producing methanol pursuant to this permit shall be measured by or on behalf of the Permittee in a manner satisfactory to the Board, and the volumes of gas used as raw material and fuel and of methanol produced shall be separately reported to the Board in a manner satisfactory to the Board.

7. The Permittee shall satisfy the Board prior to January 1, 1982, as to the arrangements that have been made for the supply of gas for the operation of its plant, unless upon application by the Permittee, a later date is stipulated by the Board.

8. The Permittee shall obtain the approval of the Board of any major changes in design of the plant facilities.

9. The Permittee shall satisfy the Board prior to February 1, 1981, that construction of its proposed project has commenced and that construction of the proposed facilities will continue in accordance with a schedule approved by the Board.

10. During the construction of the proposed project, the Permittee shall inform the Board, on a semi-annual basis, of the progress of construction.

11. The Permittee shall operate the facilities in a manner that results in

(a) the maximum practically obtainable efficiency in the use of gas for the manufacture of methanol, and

(b) the maximum practical conservation of gas.

12. The Permittee shall not

(a) assign this permit, or

(b) release from its control the operation of the plant, without consent in writing of the Board, which may, with the authorization of the Lieutenant Governor in Council, be given by the Board upon application therefor.

13. (1) Attached hereto as Appendix A and made part of this permit, is the Order of the Lieutenant Governor in Council authorizing the granting of this permit.

(2) This permit is subject to the terms and conditions, if any, prescribed by the Order of the Lieutenant Governor in Council set out in Appendix A.

14. Where it appears to the Board or the Lieutenant Governor in Council that the Permittee has contravened or failed to comply with any terms or conditions contained in this permit or any relevant statutes or regulations of Alberta,

- (a) the Board shall review the permit and with the approval of the Lieutenant Governor in Council may cancel the said permit or take such other remedial measures as considered suitable by the Board and the Lieutenant Governor in Council in the circumstances, or
- (b) the Lieutenant Governor in Council may amend, vary, add to, or replace any terms or conditions contained in this permit.

15. Notwithstanding the provisions hereof, the Permittee shall comply with the provisions of any Act, regulation, order or direction governing the drilling for, production, conservation, gathering, transportation, processing, purchasing, acquisition, sale, measurement, reporting, testing, supply or delivery of gas within the Province.

MADE at the City of Calgary, in the Province of Alberta, this day of , 1980.

ENERGY RESOURCES CONSERVATION BOARD

Vernon Millard  
Chairman

Attachment I to O.C. No.

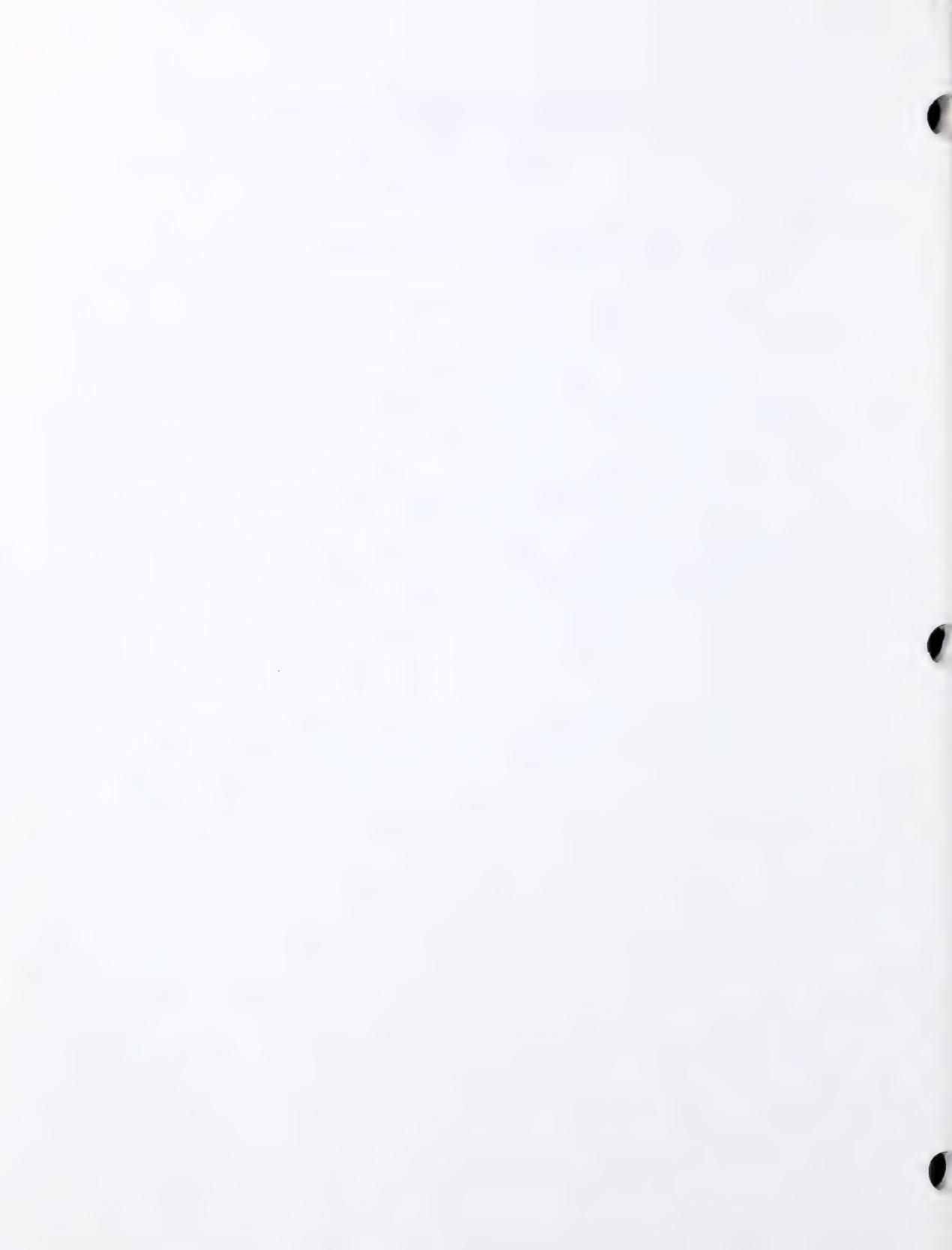
Pursuant to section 42(6)(b) of The Oil and Gas Conservation Act, the order of the Lieutenant Governor in Council authorizing the issuance of an industrial development permit by the Energy Resources Conservation Board to Celanese Canada Inc. (hereinafter called "the Permittee") is subject to the following terms and conditions:

1. The Permittee shall satisfy the Minister of Economic Development prior to February 1, 1981, and thereafter throughout the term of the permit, with respect to the use wherever practicable in the project, of Alberta engineering and other professional services, and Alberta tradesmen and other construction personnel, equipment, materials and supplies from Alberta.
2. The Permittee shall satisfy the Minister of Energy and Natural Resources, prior to March 1, 1982, with respect to the price to be paid for the gas used in the project.
3. The Permittee shall supply methanol from the proposed project for use in Alberta at a reasonable price, that, in the opinion of the Minister of Economic Development, can reasonably be so supplied by the Permittee.

Appendix to Recommendation for  
Order in Council  
Draft of O.C.

Upon the recommendation of the Honourable the Minister of Energy and Natural Resources, the Lieutenant Governor in Council, pursuant to section 42(3) of The Oil and Gas Conservation Act, authorizes the Energy Resources Conservation Board to issue an industrial development permit, in the form hereto attached, to Celanese Canada Inc. for the use within Alberta of gas produced in Alberta in the production of methanol, subject to the terms and conditions set out in the attachment hereto, marked as Attachment I.





ENERGY RESOURCES CONSERVATION BOARD  
Calgary Alberta

DEC 1

CHIEFTAIN DEVELOPMENT CO. LTD.  
APPLICATION FOR APPROVAL OF A  
GAS PROCESSING PLANT  
HYTHE-BRAINARD AREA

Decision 80-26  
Application 790487

The Board has reviewed the report of its examiners, attached hereto, and their recommendations on the application by Chieftain Development Co. Ltd. respecting a proposed gas processing plant. The Board accepts the evidence as summarized by the examiners and, except for a few matters, agrees with the recommendations. The Board's comments and conclusions respecting the examiners' report are as follows:

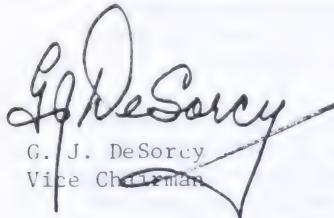
- 1 In assessing the several concerns identified by the interveners respecting the operation, safety, and impact of the proposed plant, the Board believes that regard must be given for similar operations in other parts of the province. While the proposed plant would be the first sour gas processing plant in the Grande Prairie area, there are some 110 sour gas plants operating elsewhere in the province. Several of these plants are located in more densely populated areas, for example, the general Calgary area. Some of these plants process gas that has a considerably greater H<sub>2</sub>S content (34 per cent as compared to the seven per cent at the proposed plant) and process greater volumes than are planned to be processed at the proposed facilities. The operating record of these plants has been good and serious accidents have not occurred during the more than 25 years that sour gas plants have been operating. Furthermore, as indicated by the examiners, technology has improved since these plants were placed on production and those improvements are embodied in the proposed Chieftain plant. The Board is of the view that existing sour gas plants in the province have not had a significant impact on the health of people, domestic animals, or wildlife.
- 2 On page 13 of the report respecting the question of Public Safety, the examiners say they "are satisfied that the applicant would compile a complete list" of area residents for its emergency operation plan. The Board is also satisfied but nevertheless, believes the applicant should be required to complete the list and would make such an action a condition of any approval.
- 3 With respect to sulphur recovery, the Board agrees with the examiners' recommendation respecting the required recovery level. It does so on the basis of the evidence presented at the hearing regarding the appropriateness of various levels of sulphur recovery. For this reason, the Board does not believe that the parties to the hearing need be allowed to comment further on this

matter, and the Board therefore does not accept recommendation (c) on page 33.

Subject to the above comments, the Board accepts the recommendation of the examiners that the application be approved subject to certain special clauses to be included in the approval along with other standard clauses included in most sour gas processing approvals.

DATED at Calgary, Alberta on 1 December 1980.

ENERGY RESOURCES CONSERVATION BOARD



G. J. DeSorcy  
Vice Chairman

Attachment

ENERGY RESOURCES CONSERVATION BOARD  
Calgary, Alberta

CHIEFTAIN DEVELOPMENT CO. LTD.  
PROCESSING OF SOUR AND SWEET GAS  
HYTHE-BRAINARD AREA

Examiners' Report  
Application 790487

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## 1 SUMMARY

## The Application and Hearing

Chieftain Development Co. Ltd. applied to the Board for approval to construct a gas processing plant some 19 kilometres (km) north-west of Hythe in the fringe of an agricultural area in the western part of the Grande Prairie area of Alberta (see Figure 1 of section 2). The plant would process a maximum of 3.68 million cubic metres or 130 million cubic feet per day of natural gas, three-quarters of which would be sour gas containing up to approximately 7 per cent hydrogen sulphide. The plant would produce marketable sales gas, small quantities of natural gas liquids and up to 246 tonnes per day (t/d) of sulphur. Some 97 per cent of the sulphur in the gas would be recovered as elemental sulphur on a quarterly average basis. A maximum of 15.2 t/d of sulphur dioxide would be emitted to the atmosphere from a 89-metre (m) incinerator stack.

A hearing of the application was conducted in the area by examiners appointed by the Board. The hearing concluded on 22 August 1980.

## The Interventions

Some 25 interventions from groups and individuals were considered at the hearing. Several additional submissions were received but not represented at the hearing.

While several of the submitters supported the application, primarily on economic grounds, the majority either opposed the application or stated that the plant would be acceptable only if sulphur dioxide emissions were eliminated or essentially eliminated. These interveners were very concerned about the impact of sulphur dioxide on the acidic or near-acidic soils which are common in the area. They feared reduction in crop yields, and increased incidence or severity of white muscle disease in cattle through reduction in selenium (Se) uptake. A second major concern was for the trumpeter swan, a threatened species which nests and feeds at several shallow lakes in the area. It is believed that sulphur dioxide might cause changes in the lakes so that they would no longer be suitable or acceptable habitat for the birds, or that noises or light from the plant might upset the birds on the nearest lakes.

A number of interveners foresaw social problems or changes which they could not readily accept. Other concerns involved the need for the plant, the plant location, public safety and health, adequacy of waste disposal, aesthetics in the vicinity of the plant, use and value of land near the plant, protection of wildlife in general, rusting of metal fences, buildings and equipment, and the need for adequate monitoring of effluents and the effects of the effluents on the environment. The possible overlapping of plumes from future plants and the contribution of the plant to the continental or global "acid rain" situation were also matters of concern.

### The Report

The examiners have organized the issues under four main headings and many subheadings. The examiners' views are expressed at the end of each subsection and are summarized and correlated in a findings section. Some general comments on the need to better inform the public and assist them in presenting their input are included in a separate section. Because of the number of issues, it is not practical to briefly summarize the evidence and conclusions on each issue.

### Key Findings and Recommendation

The examiners find that the plant is required for the processing of the gas resources in the area and that it should be approved subject to certain conditions. The examiners are not convinced that the plant would cause environmental damage in the area but, having regard for the possible sensitivity of soil in the area to acidification, to the state of the art in predicting the sulphur dioxide deposition rate and the effects of sulphur deposition, the examiners find that sulphur recovery efficiency of 98 per cent under normal operating conditions or 97.7 per cent on a minimum quarterly average basis should be required. The corresponding expected average daily emission would be some 10 t/d of sulphur dioxide.

The examiners have some concern about the safe operability of the plant on a partially attended basis and propose that proof of such be demonstrated on a fully attended basis before implementation.

## 2 INTRODUCTION

### 2.1 The Application

Chieftain Development Co. Ltd. applied, pursuant to section 38 of The Oil and Gas Conservation Act for approval to construct a gas processing scheme in the Hythe-Brainard area. The proposed plant would be located in the north-west quarter of Section 18, Township 74, Range 12, West of the 6th Meridian (Figure 1).

The plant would process a maximum of 3681 thousand cubic metres per day ( $10^3 \text{ m}^3/\text{d}$ ) or 130 million cubic feet per day of raw gas consisting of  $845 \times 10^3 \text{ m}^3/\text{d}$  of sweet gas and  $2817 \times 10^3 \text{ m}^3/\text{d}$  of sour gas from which



$3345 \times 10^3$  m<sup>3</sup>/d of sales gas, 245 tonnes per day (t/d) of sulphur, and 35 m<sup>3</sup>/d of pentanes plus would be recovered.

Approval was requested to flare a maximum of 15.19 t/d of sulphur dioxide or 7.59 t/d equivalent sulphur through an incinerator stack 89 m high.

## 2.2 The Hearing

A public hearing of the application was held before examiners appointed by the Energy Resources Conservation Board. It began on 22 July 1980 in Hythe, Alberta but was adjourned on that date to allow additional time for the preparation of interventions. The remainder of the hearing was conducted in Beaverlodge, Alberta on 14, 15, 20, 21, and 22 August. The examiners were H. J. Webber, P.Eng., and L. A. Bellows, P.Eng. of the Board's staff, and S. L. Lupul, P.Eng. of the staff of Alberta Environment.

A list of those appearing at the hearing is given in Appendix A.

## 2.3 Background

In the proposed plant, sweet gas processing would consist of inlet separation and refrigeration for control of hydrocarbon and water dewpoints. The hydrocarbon condensate would be stabilized in a trayed column. The sour gas processing would include diethanolamine (DEA) sweetening and sulphur recovery. The sulphur recovery unit would use a 3-stage modified Claus process and would recover a minimum of 97 per cent of the sulphur on a quarterly average basis.

Emergency shut-down systems and other safety features would be provided to handle emergencies during hours of unattended operation.

As part of its submission, Chieftain submitted an Environmental Impact Assessment (EIA) prepared by its consultants.

At the time of the hearing, Alberta's sulphur recovery guidelines indicated a minimum quarterly average recovery efficiency of 95 per cent would be expected of a plant of the size proposed. Subsequent to the hearing, new sulphur recovery guidelines, as set out in Informational Letter IL 80-24, increased the required quarterly average sulphur recovery of a new plant of the proposed size to 97.7 per cent on the minimum quarterly basis (equivalent to 98 per cent on a normal operating basis).

The land surrounding the proposed plant is undulating to gently rolling. The proposed site is on land having low potential for agricultural use and is a distance of about 2.5 km from the nearest trumpeter swan breeding lake. The site is in a sparsely populated area, close to existing road access and is adjacent to the Northern Alberta Railway

line. It is visually buffered from the surrounding land, but portions of the incinerator and flare stacks would be visible from some frequented viewpoints.

More than 30 individuals or groups submitted interventions, although several of the interveners were not represented at the hearing.

Figure 1 shows the location of the plant site, lakes, communities, and other features pertinent to the application. It also indicates the residence or home quarter-section of most of the rural interveners.

### 3 PRELIMINARY ISSUE

An issue which arose at the hearing was the status of interventions unsupported by a qualified witness. No witness appeared on behalf of the written submissions of Ducks Unlimited, the Bear Lake Farm Rights Group, the Hythe Chamber of Commerce, and Brian and Mary Peterson. A submission from the Village of Hythe was tendered by the village's secretary and was marked as an exhibit. The witness responded to several questions by interveners before acknowledging that she was not qualified to speak on behalf of the village council, the sponsors of the submission.

Chieftain's solicitor, Mr. D. G. Ingram, applied to have "the representations made by this witness and the submission filed on behalf of the Village of Hythe ... struck from your record, because there is no person here who can be properly cross-examined". He said this was preferable to leaving "an intervener in a position where he cannot adequately cross-examine on the intervention". Mr. Ingram said he assumed the other unsupported submissions would not be filed in the proceedings. He indicated that he believed this to be consistent with the Board's usual practice. He had no objection to deferral of a decision on this procedural matter.

The village's witness had no objection to Mr. Ingram's application as it pertained to the village's submission. Mr. J. D. Dilay, of the Board's staff, said that he had discussed the matter with a Board solicitor and was advised that the marked exhibit "should stay within the proceeding unless the village were to voluntarily withdraw it". He also indicated that the examiners could place appropriate weight on the evidence, including no weight at all. Most of the interveners did not have copies of the submissions in question, and none spoke to the disposition of them.

The examiners deferred decision on the matter and are addressing it here. The examiners have now confirmed the mentioned advice of the Board solicitor.

In the past, the Board has not consistently accepted or rejected unsupported submissions, but has had regard on each occasion for the nature of the submissions and the merits of the positions taken by the representatives of the participants as to the acceptability of the

submissions. The examiners believe that this procedure falls within the Board's authority under The Energy Resources Conservation Act and the Rules of Practice of the Energy Resources Conservation Board.

In the case at hand, the examiners consider the unrepresented submissions to properly set out the considered views of the submittors, and believe the submissions should be considered as valid representations before the proceeding. However, as no qualified witness was available to speak to any of the submissions, they will be given considerably less weight than they would have received if supported by qualified witnesses. No weight will be given to the testimony of the witness who appeared for the Village of Hythe.

#### 4 ISSUES

The issues raised by the application are:

- the need for the plant
- the impacts of the proposed plant in the local area, that is, within a few kilometres of the plant site
- the impacts of the proposed plant on a regional level, that is, in the general area around the plant extending some 30 kilometres or so from it
- other issues including plant design and efficiency, ambient air quality, preservation of archaeological and historical sites, and accuracy of the sulphur deposition model used in support of the application.

The second and third issues are subdivided as indicated in sections 6 and 7 of the table of contents.

#### 5 THE NEED FOR THE PLANT

Chieftain indicated that it had drilled and completed many sweet and sour gas wells in the area around the proposed Hythe-Brainard gas plant and it must now start to produce the reserves in order to satisfy the requirements of its leases. It had insufficient sweet gas reserves to meet its forthcoming contracts and must therefore start producing the sour gas reserves in order to meet its contractual needs. Chieftain noted that the closest existing sour gas processing plant was 83 km from the proposed site. It intended to build a sour gas plant with provision to process gas that may be available from other owners in the surrounding area. Chieftain indicated that it had been offered sales contracts for produced sulphur.

Many of the interveners expressed the view that, since a large surplus of natural gas existed in Alberta, processing the sour gas was not necessary. They contended that Chieftain wanted to process the sour gas not out of need, but for profit only, and therefore it should be

left in place until such time as 100 per cent sulphur recovery was possible. Several interveners who agreed that the company had a need to process the sour gas recommended that the highest possible sulphur recovery levels be imposed on the plant. Mr. N. Tiesenhausen stated that food production should have first priority. He proposed that sour gas plants be built where they would least affect the agricultural community.

The examiners note that Chieftain and its partners have paid for rights to the gas which they have discovered in lands within the project area, that they have tentatively contracted for the sale of the gas, and that they have the right and even the obligation to produce the gas subject to abiding by applicable legislation. The laws are designed to ensure that a project will not proceed where the adverse impacts exceed certain bounds or are, in total, disproportionate to the benefits from the project. The examiners find that the gas requires processing and that there are no existing gas processing plants which could conceivably accommodate the gas to be produced from the gas fields involved in the application. On the basis of the above, the examiners conclude that processing facilities are required in or near the gas fields from which the applicant and its associates intend to take production.

The examiners believe that the interveners' views, as summarized above, are based on a concern that the proposed gas processing scheme could have substantial adverse impacts and that the possibility of these impacts being realized should preclude the scheme's implementation, at least until gas is in short supply. Leaving the matter of impact assessment to later sections of the report, the examiners have the following observations on the interveners' views:

- there is no reason to believe that 100 per cent recovery of sulphur from gas processing will be feasible within the foreseeable future
- deferral of sour gas production "until needed" would reduce the efficiency of resource recovery in areas containing both sour and sweet gas reserves and would probably reduce exploration for both oil and gas
- the postponement of all sour gas processing would preclude the production of crude oil containing sour gas and could cause future safety problems with old sour gas wells.

## 6 LOCAL IMPACTS

### 6.1 Sulphur Dust

Chieftain stated that it would be shipping sulphur in liquid form whenever possible. Any sulphur stored on site would be either in prilled or block form.

Chieftain said it was aware of locations in Alberta where acidification of soil had occurred due to sulphur dust. It indicated that the problem was caused by mechanical break-up and loading of sulphur under windy conditions. Chieftain stated that prilling would eliminate any potential dust problems and was satisfied that the sulphur block could be melted without mechanical break-up. Chieftain said that only negligible quantities of sulphur dust would evolve from the sulphur block. It indicated that an approval condition that there would be no mechanical break-up of the sulphur block would be acceptable.

Several of the interveners expressed concern over the possibility of environmental damage due to sulphur dust from a storage block at the proposed gas plant. Mr. Solterman, a farmer and former gas plant employee in central Alberta, appeared as a witness for Richard and Anne Harpe. Mr. Solterman said that he attributed some personal discomfort and illness to sulphur dust emitted by a gas plant in close proximity to his farm. He stated that soil acidification on his land was caused in part by direct contamination by sulphur dust.

The examiners agree that sulphur dust formed by mechanical break-up of a sulphur block can be spread onto land by wind and result in pH reduction in soil. The preferred approach is to market the sulphur in liquid form and to use remelting to recover sulphur from a block. Prilling of the sulphur also minimizes sulphur dust formation.

The examiners' opinion is that sulphur dust would not be a problem if the sulphur were handled as proposed by the applicant.

## 6.2 Control of Waste Water Releases to the Surroundings

Chieftain said that impervious material would be used under the sulphur block to prevent seepage of any water in the block area to the ground water table. Chieftain stated that plant site run-off would be contained within a dyke and ditch system designed for the worst-case rainfall. The contaminated run-off water would be skimmed of hydrocarbons, treated and tested to meet Alberta Environment's guidelines and then released to the watershed. The applicant said that waste water from processing operations would be neutralized with lime or caustic and disposed of in a deep-well water injection system. It noted that such an injection system was located near the plant site and an application would be made for the use of the well. In the event that the application were turned down by the Board, Chieftain would be prepared to truck the water to another disposal well.

Concerns were raised by several interveners over the treatment and disposal of waste water produced during plant operations. Mr. Stamm of the Swan Society stated that the Environmental Impact Assessment was inadequate and that Chieftain had not given sufficient proof that a bog adjacent to the plant would not be damaged by treated run-off water. Some interveners were concerned about the effects on cattle of drinking water made acidic by contact with stored sulphur.

The examiners believe that the controls currently exercised by Alberta Environment would be adequate to ensure that water released to the surface drainage system would not cause damage. Deep well injection is an acceptable disposal method for highly contaminated water. The examiners thus find the applicant's proposed waste water control plans to be appropriate.

#### 6.3 Effect on Groundwater Levels

Chieftain pointed out that the proposed plant would require less water than that used in three ordinary houses. It indicated that several wells would be drilled and tested for drawdown. If it appeared that the groundwater level would be excessively drawn down by plant consumption, Chieftain would truck water in from the Wapiti River.

The examiners agree that groundwater can be used to supply the water needs of this plant. However, the applicant will be required to receive approval from Alberta Environment for the use of this water.

#### 6.4 Disposal of Waste Products

Chieftain indicated that it would have pit disposal facilities for any solids resulting from sour water stripping. Other solid wastes, rags, and garbage would be disposed of at a local dump. It stated that spent catalyst and other waste chemicals would be recovered. Hydrocarbon liquids from the skimming pond would be reprocessed and sold.

The examiners agree with the proposed waste control program.

#### 6.5 Aesthetics

Chieftain stated in its EIA that the site would be visually buffered from surrounding land and that only portions of the incinerator and flare stacks would be visible from selected viewpoints. Chieftain indicated that visible emissions from the proposed plant would be negligible and any such emissions would not significantly interfere with solar radiation. It also stated that the proposed plant site had a well treed visual buffer in all directions.

Mr. Stamm stated that to his recollection there were no trees on the west side of the quarter-section containing the plant site. Mr. Fischer said that he would see yellow emissions and steam which would cause clouds so that he would not be able to see the sun. Ms. Epp, a film producer and artist, took exception to the applicant's statement that the landscape at the site was not aesthetically pleasing and said she did not want to see a plume.

The examiners conclude that an industrial development of this type would have some visual impact. The impact would be minimized by the trees surrounding the site. However, the tall stacks and, in winter,

the condensed water vapour plumes would be visible. Whether these add to or detract from the natural setting would depend on personal taste.

#### 6.6 Nuisances and Disturbances

Chieftain stated that pipeline and service corridors would provide improved access to trapline areas. It indicated that local trappers would benefit from reduced access time to particular areas. Chieftain recognized that increased trapping pressure would be placed on the fur bearing population. It pointed out that the holder of a trapline license was entitled to all fur bearing animals in his designated area and should be responsible for managing his resource from over-harvest.

Chieftain agreed that noise from construction projects could be detrimental to successful breeding by swans. It indicated that winter construction would be employed to avoid conflict with trumpeter swan populations.

Chieftain stated that construction and associated traffic and machinery operation would result in temporary disturbance to local residents. It indicated that the construction camp would preferably be a dry one (ie. alcohol not permitted) with the conduct of the workers controlled by the contractor.

Mr. O. Harpe pointed out that construction would increase public access to traplines and would result in a depletion of resources available to trappers.

Several interveners were concerned about the effects of plant construction on the mating and nesting of trumpeter swans. Mr. Stamm recommended that a restriction be placed on any construction between the dates of 15 April and 30 June to prevent any possible disruption to the mating of swans.

Mrs. Vainio was concerned about the negative aspects of a construction camp in the area. She pointed out that a large increase in vehicular traffic and heightened noise due to movement of equipment would occur during the construction period. Several interveners expressed concern about the conduct of workers during plant construction.

The examiners agree that construction of this plant would result in incremental nuisance and disturbance in the area. However, the proposed schedule for construction and the planned undertakings by the applicant for construction camp should result in a minimal and temporary impact on the community.

### 6.7 Plume and Flare Effects

Chieftain agreed that intermittent flaring would result in noise levels higher than those experienced under normal operating conditions. It indicated that intervening topography, vegetative cover and distance would reduce noise to unobtrusive levels.

Chieftain stated that in a flaring situation odours might be present over a short term. It also indicated that slight odours would result from the operation of the glycol regeneration unit and some venting of trace hydrogen sulphide. Chieftain was satisfied that very little odour would be emitted from the plant site.

Chieftain stated that only an infinitesimal temperature drop would occur due to blockage of the sun's rays by ice fog from the stack.

Mr. Stamm was concerned about the possibility of light and noise from plant flaring operations affecting the trumpeter swans adjacent to the plant. He stated that noise from intermittent flaring would be much worse than a steady noise.

The potential problem of odours was raised by several of the interveners.

The examiners accept that the operation of the new plant and infrequent flaring would produce noise, light, and some odours. The largest impact would be confined to the plant site. Noise impact on the swans would be minimized by the attenuation provided by distance and vegetation buffer. Since the plant site would be buffered by trees, the normal lighting employed at the plant should have little if any impact on swans. Infrequent flaring might be visible to the swans, some of which might be as close as 2.5 km distant. The effect on the swans' behaviour cannot be predicted but the examiners believe that, if there were an impact, it would likely be confined to one or two of the nearest lakes.

### 6.8 Effect of Direct Impingement of Plant Emissions

Chieftain stated that the plant would be designed to meet Alberta Environment's air quality objectives under all operating and atmospheric conditions and that these standards are designed to control sulphur dioxide emissions such that acceptable environmental quality is maintained at all times. Chieftain contended that the emissions from the proposed plant would have negligible effect on the health of humans, livestock, or wildlife.

The Calihoos felt that the health of their children might be affected by sulphur dioxide ( $SO_2$ ) emissions from the plant. They pointed out that there was a lack of scientific research into the relationship between  $SO_2$  emissions and lung and anemia problems, and suggested that sudden infant death syndrome might be linked with sulphur emissions. Mr. Solterman blamed  $SO_2$  emissions from a gas plant in the vicinity

of his farm for many of his personal health problems. Some of the interveners contended that less than 99.9 per cent recovery would be detrimental to their health and to the health of livestock. Several were concerned that birds would be killed by flying through the plume or by being attracted to the flare.

The examiners believe that any impingement of the plant's emissions would have no adverse impact on the health of people, domestic animals, or wildlife. There is no evidence of adverse health effects when the ambient concentration of SO<sub>2</sub> is controlled to the levels which this plant would be required to maintain.

#### 6.9 Public Safety

Chieftain stated that a thoroughly comprehensive list of residents would be compiled for use in an emergency contingency plan prior to plant construction. Chieftain said that in an emergency it would be primarily concerned about getting people out and would aid animals as a secondary measure.

Chieftain said that the plant could be operated safely and efficiently on an unattended basis. Automatic controls would be installed to handle any flaring conditions or upsets in an unattended mode. Chieftain indicated that the maximum time for the person on call to respond to an upset would be one hour even under severe weather conditions.

Many of the interveners pointed out that Chieftain's tabulation and map of the names and location of residents in the area was very incomplete.

Concern was expressed regarding evacuation of livestock in an emergency, and compensation if highly valued brood stock were destroyed.

Ms. Kirley stated that it would be difficult, under blizzard conditions, for a person living relatively close to the plant to get through in one hour and therefore the plant should be continuously attended.

The examiners agree that, given a comprehensive and superior control system, the plant could be operated safely in an unattended mode and could adequately handle emergency situations. However, the examiners believe that the plant should be operated on a full-time attended basis until there is proof that unattended operation is safe and that the control system is tested to handle emergencies in a fail-safe manner.

The examiners have noted the deficiency in the list of area residents and are satisfied that the applicant would compile a complete list in the emergency plan which must be prepared before plant start-up.

The health and safety of residents is of primary concern and their evacuation during an emergency is of top priority. Movement of large numbers of domestic animals could jeopardize safe evacuation of people.

The examiners recognize that brood animals have values in excess of market value for slaughter. However, it appears that an owner would be obliged to establish and maintain a record of fair market value for these animals to arrive at compensation if the animals were destroyed.

#### 6.10 Property Values and Development Potential

Chieftain said that its opinion had been that property values of land for about 2.5 square kilometres surrounding the plant might conceivably decrease by about 10 per cent, but said that property values in the area, as reported by a professional appraiser, were increasing at a rate of 6 per cent per month due to oil activities.

Chieftain pointed out to Mr. R. Tiesenhausen that it believed he could legally construct a building in a quarter section adjacent to the plant, subject to municipal by-laws.

Several interveners indicated that compensation should be paid for any decrease in the value of land located near the plant site.

The examiners expect that there could be a temporary decrease in the value of land adjacent to the plant, but values would be regained shortly after the plant became operational. The presence of the plant would create a need for people to inhabit the area and this would create a demand for land. As a result land prices would likely rise.

The examiners note that the local planning authorities have responsibility for imposing control on developments in their jurisdictions. The plant and related developments could impose some constraints on the potential development of land immediately adjacent to the plant and gas gathering rights-of-way.

#### 7 REGIONAL IMPACT

The impacts dealt with in this section are those which are of potential importance both within and beyond the small area considered in section 6. The applicant concentrated attention on a study area approximately 30 km square, with the plant in the west-central portion of the area. Some of the effects may extend beyond that area.

## 7.1 Short and Long Term Effects of SO<sub>2</sub> and NO<sub>x</sub> Emissions

This sub-section deals with the short and long term effects of emissions of sulphur dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>) from the proposed plant. .

### Applicant's Views

Chieftain indicated that there was little potential at the plant for generating NO<sub>x</sub> emissions and that it was satisfied that little nitrification of the soil or other effects would occur as a result of NO<sub>x</sub> emissions.

With respect to the concentration of SO<sub>2</sub> in the ambient air, the applicant said that continuous atmospheric emissions would be maintained within the air quality objectives established by Alberta Environment. Visible vegetation damage should not occur as a result of the plant emissions. Monitoring work by McKinnon, Allen & Associates on vegetation around gas plants of approximately the same size as the proposed Hythe plant had not identified any visible damages.

Chieftain's environmental consultant, Western Research, employed a depositional model to predict the distribution of sulphur in the study area. The model's accuracy is discussed in section 8.4. The results from this computer model indicated a peak concentration of 5 kilograms per hectare (kg/ha) or 5 lb. per acre of sulphur per year at a point some 10 km east north-east of the plant. Some 40 to 50 sections of land would annually receive 2 or more kg/ha, according to the model results. As a precautionary measure, the expected maximum SO<sub>2</sub> emissions were increased by 40 per cent in all calculations. Chieftain indicated that the calculated deposition rates were broadly supported by evidence of deposition from other plants in Alberta. Chieftain's consultants indicated that annual deposition of sulphur from natural resources is approximately 5 kg/ha, or the same as the maximum expected deposition from the plant.

Chieftain's witnesses stated that the soils in the area are slightly acidic. The most productive soils in the area (the Albright associations) have significant organic matter contents in the surface horizons. Soils with high organic matter content and high cation exchange capacities are resistant to change in pH. The Albright soils have a long history of cultivation. The pH has not dropped significantly even with the use of nitrogen fertilizers. The small amount of SO<sub>2</sub> and NO<sub>x</sub> emitted from the plant during its life should not significantly depress soil pH. The predicted maximum annual sulphur deposition rate of 5 kg/ha is about equal to the sulphur removed from the soil by agricultural crops. Chieftain observed that if its emissions were responsible for reducing soil pH it would have to accept responsibility for the cost of liming the soil.

The applicant's consultant stated that the soil in the area is naturally low in Se and consequently livestock require Se-Vitamin E

supplementation to prevent white muscle disease. The recommended supplementation now practiced would not change as a result of the gas plant operation. Chieftain further contended that, on the basis of testing done near the Waterton plant and on the predicted deposition rates, SO<sub>2</sub> emissions from the proposed plant should not affect Se uptake by cattle.

Chieftain stated that the lakes in the study area are highly alkaline and contain moderate concentrations of carbonates, primarily in the form of calcium carbonate. It believed that small additions of sulphur to local lakes would not adversely affect water quality. Chieftain observed that the lakes have been exposed to the acidifying potential of sulphur emissions from natural sources for long periods of time without adverse consequences.

Chieftain stated that it would be liable for any reparations if any damage to farm machinery, buildings, or fences were attributable to emissions from the plant.

According to the applicant, timber would not be adversely affected by SO<sub>2</sub> emissions nor would the successional progression of plant communities be altered.

Chieftain considered a study on the effect of toxic materials on honey bees to be unnecessary.

#### Intervenors' Views

The intervenors were concerned that the emissions of SO<sub>2</sub> and NO<sub>x</sub> from the gas plant would have a detrimental effect on their health, reduce productivity of their soil because of increased acidity, increase Se deficiency in livestock and wildlife, adversely affect the trumpeter swan habitat, and decrease the life expectancy of machinery and fences by increasing the corrosion rate.

Some of the intervenors indicated that the soils in the region are acidic, having a pH less than 6, and have little, if any, free lime. These soils were said to be different from the soils in other parts of Alberta which have similar pH but do contain free lime and therefore have an ability to resist pH change due to sulphur deposition. The observed impacts of gas plant emissions in these other regions of Alberta are not necessarily applicable to the soils of the Grande Prairie region.

Dr. R. Klemm, a research chemist and witness for Mr. O. Harpe, testified that not enough was known about the buffering capacity of the Peace River soils to allow for proper assessment of the emissions from the proposed plant. He suggested that rectification would be impossible if soil pH changed due to acidification by SO<sub>2</sub> emissions.

Dr. Nagge, a veterinarian appearing on behalf of the Elvestads, indicated that a Se deficiency in livestock is aggravated by sulphur in the diet.

The Elvestads pointed out that Se and copper uptake are affected by increased sulphur in the livestock's diet. They also suggested that the SO<sub>2</sub> emissions from the plant might convert Se dioxide to elemental Se which is unavailable for vegetation uptake.

Mr. Solterman claimed that SO<sub>2</sub> emissions from a neighbouring gas plant had caused rusting and seizing of his machinery within one year. Mr. Harpe stated that corrosion rates of fences in the Hythe area had been negligible. He also contended that corrosion and depreciation of his machinery would be accelerated by sulphur emissions.

The Swan Society stated that lakes in the area were shallow and had a limited buffering capacity. Mr. Stamm contended that lake levels fluctuate greatly and that any chemicals in the lake during low levels would become more concentrated and harm wildlife populations.

#### Examiners' Views

The examiners note that many of the interveners introduced evidence based on publications, media reports and in one case personal experience of problems encountered near sour gas plants in several areas of Alberta, and industrial operations elsewhere. The concerns of the residents are understandable in view of the high level of oil and gas activity, the fact that the proposed plant would be the first sour gas plant in the area, and given the particular agricultural soil conditions in the area.

The examiners' analysis of some of the specific issues follows:

1. NO<sub>x</sub> emissions would be at a very low rate and are not a cause for concern.
2. SO<sub>2</sub> concentrations would be required to meet very strict standards, and incidents of visible or economic damage to crops due to contact should not occur. This conclusion is supported by the general lack of evidence of environmental damage caused by approved emissions from numerous industrial plants located throughout the province.
3. The evidence at the hearing was that the total dietary needs of the livestock were commonly being supplemented by injection and by oral administration with the salt consumed. Therefore, any decrease in forage Se content, if it were to occur, would not affect the amount of Se supplementation.
4. There is no evidence or reason to expect that discernible corrosion of metal objects would occur.
5. Liming of agricultural soils acidized by fertilizers or SO<sub>2</sub> appears to be a technically feasible restorative procedure with some future practical potential should it ever become necessary. (This matter is discussed more fully in section 7.6).

6. The lakes within the study area are similar to other lakes located within the sedimentary basin of western Canada. These lakes are known to be well buffered.
7. There is no evidence to suggest that the bees in the area would be adversely affected by the emissions from the plant. To the examiners' knowledge, bee damage due to SO<sub>2</sub> emissions has not been reported in the province.

The examiners note that, while some conclusions may be arrived at with reasonable confidence, there are concerns regarding several unknowns which determine the long-term impact of sulphur deposition on soils:

- the true rate of sulphur deposition on soils
- what happens to sulphur after it enters the soil
- the sensitivity of soils to sulphur after it enters the soil
- the lack of definitive soil monitoring procedures which can differentiate effects of sulphation from other effects such as moisture content, seasonal variation and sampling error.

The examiners do not believe that these unknowns are so serious or of such magnitude that the application should be denied, however, the modest risk associated with these factors must be considered when arriving at recommendations regarding sulphur recovery levels and permissible sulphur emissions.

## 7.2 Acid Rain

Chieftain said it acknowledged the concern of the interveners regarding acid rain, but noted that the areas of western Europe and eastern North America which are wisely known as being affected by acid rain have many times the Alberta rate of acid gas emissions. It said that the proposed plant's emission would be much smaller again, by comparison. Chieftain contended that the amount of acid rain generated in the area from the plant's emissions would be very small because of the time required to transform SO<sub>2</sub> to sulphuric acid and for the subsequent deposition with rain.

A number of interveners stated that the emissions of SO<sub>2</sub> from the proposed plant and other sources should be reduced to minimize the continental or global acid rain problem.

The examiners recognize that recent published material on "acid rain" effects in certain areas of the world have caused anxiety to Alberta residents.

The examiners recognize noteworthy differences between Alberta and the regions experiencing problems. As noted by Chieftain, the emissions from Alberta sources are much less. Also, the majority of lakes in Alberta are buffered and are capable of absorbing acidic constituents without exhibiting appreciable pH change. This same property is not

exhibited by the eastern Canadian lakes nor the mountain lakes of western Europe.

The examiners conclude that occurrence of damage to soil or lakes by acid rain generated from the acid gas emissions from the proposed plant is extremely unlikely.

#### 7.3 Impacts of Emissions From This Plant as Judged From Impacts at Other Plants

Chieftain pointed out that the effects of emissions from other plants could not be compared with those from its plant because of such factors as weather conditions, topography, and the amount of emissions. Also, control of emissions has improved over time, so past experience may not be pertinent.

Several interveners pointed out the reported adverse effects of sulphur emissions from sour gas plants in other areas of Alberta and suggested that similar effects could result from emissions at the proposed plant.

The examiners note that most plants differ from the proposed plant in some important way such as emission rate, terrain, age, process, fluctuations in throughput or local climate. Thus, the performance and effects of such plants cannot be extrapolated without qualification to the proposed plant. It is worthwhile noting that, while a few plants have had some emission problems, the majority of the sour gas plants in the province have operated with no reported adverse effects. The examiners believe that advancing gas plant technology, improving atmospheric modelling, and solutions arrived at through experience make it less likely that problems will occur at new plants.

#### 7.4 The Impact of Future Sour Gas and Oil Sands Plants

Chieftain stated that it was unlikely that additional sour gas plants would be built in the area at the present time. It indicated that it was not aware of any further occurrence of sour gas in the plant area. Chieftain indicated that, if it wanted to build a second sour gas plant in the immediate area, the new plant would be subject to stricter restrictions on allowable emissions. It would also have to demonstrate that it was not possible to process the sour gas at the existing gas plant. Any impact assessment, on the area, of a second plant would have to be considered in conjunction with the existing plant.

Several interveners were concerned that many sour gas plants and an oil sands industry would develop in the area resulting in large SO<sub>2</sub> emissions.

The examiners have collected the Board's estimates of reserves of sour gas in the whole Peace River region of Alberta, and note that the occurrence of sour gas is very spotty and is confined essentially to geological horizons of the Paleozoic era (such as the Leduc formation oil fields near Valleyview and the Wabamun formation at Gold Creek) and the Triassic gas reservoirs in the Doig and Halfway formations. The vast bulk of the gas reserves in the region are found in the overlying Cretaceous sandstones of the Mesozoic era. Essentially without exception, these zones contain sweet gas. These sands contain the vast potential reserves of the famous deep basin.

Of the currently established reserves of gas (including oilfield gas), the Sinclair Doig reservoir, which would supply the sour gas to Chieftain's proposed plant, contains approximately half of the producible hydrogen sulphide ( $H_2S$ ) in the region. A low-productivity gas reservoir several townships to the south in the Halfway formation contains approximately one-quarter of the  $H_2S$ , but this gas is considered not economically producible at this time. The remaining one-quarter of the  $H_2S$  is widely dispersed in approximately 15 reservoirs of varying geological age.

On the basis of this information, the examiners conclude that gas plants required to process sour gas in the area will be few in number, relatively small, and well distributed areally. The examiners recognize that gas plants in British Columbia could have an effect on sulphur dioxide concentrations in the area, but believe that few plants will be built and that the dilution of concentrations with distance travelled will minimize any possible impact. In total, the impact of emissions from future gas plants is not expected to cause significant overlapping of sulphur dioxide plumes.

The examiners believe that major production from the Peace River oil sands (which lie some 150 km to the east of Hythe) will not occur for many years. By the time it starts, the emissions from the proposed Hythe gas plant would be much reduced due to reservoir depletion. Because of the time factor, the prevailing wind direction, and the substantial distance involved, the examiners do not consider plume overlap to be a significant factor.

Future emitting plants of all types would be required to account for all existing plumes and ensure that permissible concentrations were not exceeded.

#### 7.5 Need For Independent Plant Effluent Measurement, and Baseline and Monitoring Studies

Chieftain stated that it was responsible for monitoring emissions on a continuous basis and that the information is reviewed by the government, which would take appropriate action. It said that it would be more than agreeable to let the government monitor emissions from the plant.

Chieftain proposed that it enter into an extensive monitoring program which would start before the operation of the plant, and provide baseline data. Chieftain said it would be monitoring soil pH as required by Alberta Environment and that information obtained from monitoring would be made public. It pointed out that the company could not be responsible for monitoring every facet of the area. Chieftain said it had agreed to work with the Research Secretariat in doing a sulphur isotope study on the soils in the area if the methodology is applicable.

Many interveners expressed the view that the government or other independent agency should monitor sulphur emissions from gas plants in Alberta. Mr. Lumbis stated that further and more comprehensive studies are necessary in order to define and acquire a proper data base. These studies should include among others, invertebrates, aquatic plants, and water quality of lakes in the area. Mr. Stamm recommended that a long-term wide-base monitoring program be established. He also recommended that a baseline study, largely financed by Chieftain, be established. Mrs. Callihoo requested that the sulphur isotope method be used.

The examiners believe that the existing effluent monitoring methods, comprising monitoring by the plant operator according to standards set by Alberta Environment with reporting to Alberta Environment and the Board combined with periodic inspections and measurements by the two agencies, would be adequate.

With regard to baseline studies, the examiners agree that selected studies may be required, but do not believe that an applicant should be responsible for such studies on variables which are unlikely to be affected by the applicant's project or are so complex that the data would not be useful over the expected life of the project. The examiners believe that the soil pH monitoring which would be required by Alberta Environment and the sulphur isotope study which Chieftain has volunteered to participate in would be adequate.

#### 7.6 Feasibility and Need for Liming

Chieftain stated that the rate of sulphur deposition would not require liming of the soil. It indicated that the practice of liming was recommended in the area now but was not commonplace. Chieftain said that it would be liable should the plant be responsible for acidification of the soil in the area.

Mr. R. Harpe stated that liming was expensive and labour intensive. Mr. O. Harpe maintained that liming may be detrimental if practised on a long-term basis. The Lobergs noted that the cost of liming was \$300 per acre and said it was uneconomical to lime soil based on a cost benefit analysis.

As stated in section 7.1 and 7.2 the examiners do not anticipate that soil pH will be affected by the plant and therefore do not believe that liming will be required as a result of plant operations. The economic feasibility of liming to offset a natural or induced

low pH condition in the area appears to be poor at this time due to the lack of bulk supplies in the vicinity.

#### 7.7 Standards for Sulphur Emissions and the Overall Adequacy of the Proposed Level of Sulphur Recovery

Chieftain said that, in proposing to recover 97 per cent of the sulphur it was exceeding the guidelines by 2 per cent despite increased costs. It maintained that the plant would fully protect the environment from SO<sub>2</sub> damage. Chieftain said that it had called a contractor and found it would be impossible to get a performance guaranty on sulphur recovery at the costs set out in the consultant's letter to Mrs. Roschlaub. Chieftain stated that no company would guarantee 99 per cent efficiency at all times. Chieftain stated that in order to achieve 98 per cent recovery, a fourth stage would have to be added to the Claus process and this would increase the cost of the sulphur recovery unit by one-third. It stated that, even with this addition, it would be hard pressed to meet an approval which required 98 per cent recovery.

Most interveners stated that they wanted 99.9 or 100 per cent sulphur recovery enforced regardless of cost. Mrs. Roschlaub, witness for the Peace Country Acid Soils Committee, submitted a letter from a consulting firm which indicated that a tail gas clean-up unit could obtain 99.8 per cent recovery. The letter included rough estimates of the incremental capital cost to recover 99 to 99.8 per cent of the sulphur. Several interveners stated that the standards for sulphur emission as set by the government were unacceptable for the Grande Prairie region.

The examiners note that the requirements for sulphur recovery at gas plants are not expressed in regulations but are in the form of guidelines; presumably this is so that many factors can be taken into account and a unique requirement imposed in unusual or exceptional circumstances. In the case at hand, the examiners conclude that the soil in the area has particular properties which justify deviation from the 95 per cent requirement which would be determined from a mechanical interpretation of the guidelines. In proposing to recover 97 per cent of the sulphur, the applicant recognized that this represents a better balance between environment protection, project economics, and available technology.

The examiners believe that the extreme sulphur recoveries proposed by the interveners cannot be justified on the basis of the information available to the examiners. Certainly, 100 per cent recovery is not feasible on a continuous basis.

The examiners conclude that a decision on an appropriate sulphur recovery level should be made having regard for all pertinent issues discussed in this report.

### 7.8 Siting of the Plant

Chieftain stated that it had evaluated several potential sites for the gas plant, all close to its gas reserves. The preferred site was selected because it minimized adverse impacts and represented the best balance of a number of important factors. The applicant acknowledged that the cost saving resulting from locating adjacent to the railway line was an important factor. Chieftain opposed a suggested site north of Highway No. 2 because it would result in higher costs and disturbance of the environment, and would cause incremental impact on trapping.

Several of the interveners disagreed with the applicant over the siting of the plant. A common view was that the gas plant location should be moved to a wooded area north of Highway No. 59 or north of Highway No. 2 where there was less interference with agricultural land. Mr. Lumbis stated that he would prefer to see the plant situated as far as possible from the prime swan nesting sites. Mr. Johnstone indicated that the plant would be better located north of Highway No. 2 in the Saddle Hills. He stated that the cost of constructing a railway spur would be much less than the additional cost to reach 99 per cent sulphur recovery.

The examiners agree that, if the plant were to be located in the general area of the gas wells and near the rail line the proposed site is suitable. With regard to the proposal by several interveners that the plant site should be moved north to unoccupied land, the examiners believe that the disadvantages of a possible longer sour gas pipeline system, remoteness of plant operators from the well sites, and construction of a railway spur line and road outweigh, both environmentally and economically, any minor advantages such a site may have through its removal from the farming community.

### 7.9 Social and Economic Costs and Benefits, and the Effects on the Residents' Chosen Way of Life

Chieftain stated that approximately 25 people would be hired to operate the plant and that 19 might be hired locally. Chieftain indicated that local people with gas plant experience would be hired if possible. It pointed out that the availability of skilled labour in the area was low and generally speaking there was a shortage of people in all skilled trades. It was Chieftain's desire to hire the largest number of local people and to provide training for those who wished to be trained. Unskilled labour would be used wherever possible in the construction of the gas plant and pipelines in the area. Chieftain indicated that it would encourage its contractors to hire locally. Some of the skilled labour would have to be brought in from outside the region to ensure proper operation of the gas plant. Chieftain indicated that additional employment opportunities would include direct and induced secondary jobs associated with provisions of goods and services during construction and operation of the plant. It stated that it preferred to use local business for goods and services wherever possible.

The applicant stated that the province and the Horse Lake Band would receive very substantial economic benefit from the project. The local area would receive direct and indirect benefits during construction and operation. Annual wages of plant personnel during the operating life would be \$500 thousand, and municipal taxes would initially be approximately \$150 thousand. Chieftain indicated that the social and community impacts would be of minor significance, but that most of the impacts would be positive.

In response to a question, the applicant stated that the contractor would be responsible to provide a crew that would not cause disturbances in the town. Chieftain said it could not comment on the relationship between the influx of oil and gas workers and the crime rate in the community.

Chieftain stated that it could not estimate the decrease in royalties to the Horse Lake Band which would result if stricter sulphur emission controls were required. It indicated that in computing royalty payments certain capital and operating costs were allowed as deductions, i.e. the greater the capital costs, the smaller the royalties paid.

Chieftain stated that it, like anyone else, would be liable for damages caused by its operations. It said that some damage in field operations were inevitable, and its policy was to settle claims without involving the courts.

Several interveners stated that little or no benefit would be received from the project by the local people. Mrs. Vainio stated that some benefit might go to the tradespeople but none to the farmers.

Mr. Romanchuk, appearing for Mr. Barnes, pointed out that the presence of the oil and gas industry in the Grande Prairie region had escalated the crime rate and made honest people dishonest. Mr. Johnstone stated that the influx of oil industry personnel would lead to increased crime and degrade the morality of the local people.

Some interveners contended that the construction and operation of the plant would destroy their traditional way of life. Mrs. McAllister stated that the pace of life is now too fast. She said that family units are suffering because of the influx of people and that confusion is affecting communities.

The Horse Lake Band intervened in support of the application. It stated that benefits would accrue to the Band members and that much of the capital generated by the development would be invested in the local community. It also stated that the cost to increase sulphur recovery from 97 to 99 per cent, as proposed by some interveners, would appreciably reduce the royalties which would be received by the Band.

The Village of Hythe submitted an intervention in support of the application in which it stated that operation of the plant would result in job opportunities, increased services, creation of "spin-off" industries and increased population. The Hythe Chamber of Commerce expressed similar views. Neither intervention was supported by a qualified witness.

The examiners note that the Horse Lake Band would benefit very substantially when production commenced. Otherwise, only a modest economic benefit would accrue to the area because the plant would not be a major employer and local purchases could be minimal. Whether the economic impact on an individual would be positive or negative would depend on the individual's circumstances. The examiners note that several interveners were concerned not only about this plant, but also with the changes introduced in the area by exploration, drilling, and the gamut of oil and gas field activity. The examiners can offer no solution to the effects of industrial development and changing life styles.

#### 7.10 Concern and Extent of Concern as Evidenced by Petitions

Chieftain acknowledged the concern and extent of concern as evidenced by the number of signatures included on the submitted petitions.

Three of the petitions proposed that the applicant be required to obtain 99.9 per cent sulphur recovery from the proposed Hythe-Brainard gas plant. The petitioners expressed concern over the adverse environmental impact of the proposed gas plant on the agricultural community and surrounding lakes in the area. The extent of concern for the gas plant was reflected by the large response from people not in close proximity to the plant location.

The petition from the Horse Lake Band, however, was in favour of the application and a 97 per cent sulphur recovery requirement.

The examiners recognize that the degree of concern in the entire area is illustrated by the hundreds of signatures appearing on the petitions submitted. From a practical point of view there is little that can be done as a result of such petitions except to hold a public hearing at a location near the proposed site, and ensure that all petitioners are given the opportunity to learn the facts of the application and to present their views. The examiners believe that these objectives have been met.

## 8 OTHER ISSUES

## 8.1 Plant Design and Efficiency

Chieftain proposed to build two essentially independent gas processing trains, one for sweet gas and the other for sour gas. The sour gas processing would consist of sweetening with diethanolamine and sulphur recovery with a 3-stage modified-Claus plant. The sulphur plant would be designed to recover 97 per cent of the inlet sulphur at design flow rate; however, at much-reduced flow rates a somewhat lower recovery could be expected.

In order that the sales gas would meet its hydrocarbon dewpoint specification, 60 per cent of the pentanes plus in the inlet gas would be recovered as stabilized condensate. Overhead streams of hydrocarbon gases from the stabilizer facilities would be conserved and used as plant fuel.

Plant upsets would necessitate flaring and flaring time would be restricted to meet ambient air quality requirements. Chieftain stated that flaring time would not exceed one-half hour. The height of the incinerator stack and the flare would be adequate to maintain a ground level SO<sub>2</sub> concentration of less than 0.2 parts per million (ppm) as a one-half hour average under the most critical weather conditions. This design was based on 1.4 times the actual sulphur rate to the plant.

Chieftain stated that it would take a maximum of 48 hours to have the plant lined out and operating at maximum efficiency.

The capital cost of the gas plant and gas gathering system was estimated to be \$17,500,000 (1979 dollars). Chieftain stated that a one-third cost increase for the sulphur recovery facilities would result if 98 per cent recovery were to be attained by adding a fourth stage in the process. It stated that turn-down would be difficult since the fourth stage would operate under very critical conditions. Operating problems would become very severe as gas production declined. Chieftain could not provide accurate information on the increased cost of the plant versus incremental increases in sulphur recovery.

Chieftain said that the plant would be a modern, clean and safe plant, and a good neighbour environmentally.

The interveners were opposed to the design level of sulphur recovery and some opposed the proposed unattended mode of operation.

The examiners find the process design adequate for treating the sweet and sour gas, and for proper conservation of hydrocarbons. The proposed sulphur recovery plant, incinerator stack and flare stack heights should be capable of achieving the stated sulphur recovery level and maintaining satisfactory ground level SO<sub>2</sub> concentrations.

The examiners conclude that the incremental cost of providing a fourth stage to the modified-claus plant would not be significant in proportion to the total plant cost and could be a reasonable expenditure to achieve the incremental sulphur recovery and emission control attainable with its use.

The examiners believe that Chieftain may be overly optimistic in its estimate of the time required to line out the plant.

#### 8.2 Ambient Air Quality

Chieftain indicated that it was well prepared to meet the air quality standards established by Alberta Environment. It stated that the design of the stack was more than adequate to ensure that ground level concentrations never exceeded 0.2 ppm of SO<sub>2</sub>.

Several of the interveners indicated that ambient air quality standards were not sufficient for the Grande Prairie area.

The examiners believe that the ambient air quality standards, as set by Alberta Environment, are appropriate for the area. The standards are considered to be quite strict, and no evidence was presented to indicate that they would be inadequate for the area of the proposed plant.

#### 8.3 Preservation of Archaeological and Historical Sites

Chieftain stated that there was a residence at Brainard which had some historical value in the area. It indicated that the company had intended to fence it, place a plaque on it, and maintain the property. Chieftain stated that the residence had since been destroyed by fire and could not be restored. It stated that no archaeological fieldwork had been conducted in the study area and that only two archaeological sites had been reported. Mitigative measures would be adopted should any sites be discovered during construction.

In its environmental impact assessment, Chieftain had made reference to the Brainard Park area and made a commitment to the maintenance of the park facilities.

The examiners believe that there would be no significant adverse impact on archaeological and historical sites.

#### 8.4 Accuracy of the Sulphur Deposition Model

Chieftain stated that the maximum annual sulphur deposition rate from the plant would be 5.0 kg/ha as predicted by a sulphur deposition model which was developed by Western Research for Alberta Environment. This rate includes a 40 per cent contingency on the total sulphur emitted. The calculation employed weather data collected at the Grande

Prairie weather station, as this was expected to be reasonably representative of the region. Chieftain said the model predicts the deposition rate with an accuracy of plus or minus 50 per cent.

Several of the interveners were not convinced that the predicted sulphur deposition rate was correct. They believed that the local weather data would not have been properly reflected in the prediction and consequently the quoted deposition rate would be incorrect. They also were of the opinion that the model was not tested and could not be relied upon to judge the impact of the plant. The interveners referred to one of the applicant's source documents, "Derivation of First Order Estimates of Sulphur Deposition in the Region of Representative Point Sources", and quoted the authors as suggesting an expected error of one order of magnitude. They maintained that this suggested that the actual maximum annual deposition rate could be as high as 50 kg/ha.

Mr. R. Harpe indicated that the mapped model results accounted for only 8 per cent of the emitted sulphur within 40 km of the plant, and suggested that this cast doubt on the validity of the results.

The examiners have reviewed the referenced document and note that a model sensitivity analysis on weather variability was conducted by comparing similar plants located east of Grande Prairie and near Calgary. The difference between the calculated maximum sulphur deposition rates at Calgary and Grande Prairie was 29 per cent. It appears reasonable to conclude that the difference between Grande Prairie and Hythe would not exceed this amount.

As to the accuracy of the model, the examiners note that the authors cited four measured deposition rates near sulphur dioxide sources. Of the four results, three were in close agreement with the prediction, while one was indicated as being "over an order of magnitude higher". On this basis, the examiners are unable to conclude whether the applicant or interveners are more nearly correct in their understanding of the model's accuracy.

The examiners have checked the mapped sulphur deposition and confirm Mr. R. Harpe's finding that less than 10 per cent of the sulphur was predicted to fall within the study area. The balance of the sulphur would be deposited over a much larger area at rates approaching natural background levels.

It is worth noting that the model is one means which has been used to evaluate the impact of the plant on the soils in the area. Because of the uncertainty as to the accuracy of the prediction, the examiners will place correspondingly less weight on this information in the ultimate decision.

## 9 SULPHUR RECOVERY GUIDELINES

Subsequent to the completion of the hearing of the application, Alberta Environment and the Board jointly issued revised Alberta sulphur recovery guidelines for the gas processing industry. A copy of the guidelines is included as Appendix B. The new guidelines are the result of efforts of both federal and provincial agencies and industry. The guidelines require a greater sulphur recovery efficiency for those sour gas processing plants at which construction commences after 1 December 1980.

In requesting approval to construct, the applicant has submitted the first of a two-part application. Prior to submitting the second part requesting approval to operate, it is usual to await a decision on the first part, at which time detailed design work is completed by the applicant. If no significant changes in plans are made and the second part confirms the first part, public notice of the second part of the application may not be required.

The examiners have experienced difficulty in deciding whether, and if so how, to approach the subject of the revised guidelines. It would be difficult to ignore the guidelines because of the timing of the separate parts of the application and an anticipated start of construction. Nor does it seem appropriate to direct the use of the new guidelines without providing the applicant an opportunity to address the relevance and interpretation of the guidelines. Two factors which should be taken into account are the urgency to the applicant of a timely decision, and the difference between the quarterly average sulphur recovery requirement applied for (97.0 per cent) and the requirement (97.7 per cent) as interpreted by the examiners from the new guidelines for the size of the plant under consideration.

In light of the foregoing, the examiners conclude that it is appropriate, in the development of the findings on the application to give consideration to the requirements of the new sulphur recovery guidelines. The examiners recognize that the applicant or the interveners may wish to present views on this matter.

## 10 OVERALL OBSERVATIONS

The examiners believe that sections 5 to 8 of this report fairly set out the expressed views of the participants in the proceeding, and that sufficient evidence is available to permit the proper formulation of findings. In this section, the examiners address some general observations.

It was most obvious to the examiners that many interveners were badly upset by the prospect of a sour gas plant being operated in the area, and were genuinely fearful of what they saw as potentially disastrous effects of the plant on human health, community life, wildlife and, perhaps most of all, their soil and the livelihood derived from

agricultural pursuits. While the decision will, hopefully, take these concerns properly into account, there is little doubt that the fears will not readily diminish. It appears that there is considerable scope for government-sponsored education programs to alleviate unnecessary concerns, and for monitoring and research programs to fill knowledge voids and provide interim surveillance near new plants. To a considerable extent, the research work is underway; however, wide dissemination of the nature and results of the work would be useful.

The interveners did a remarkable job in assembling information, engaging the assistance of witnesses, learning hearing procedure, participating in cross-examination and presenting their own views and argument. Much of this was on an ad hoc basis, without early knowledge of the efforts of other interveners. The examiners suggest that, where it can be foreseen that a number of local interveners wish to participate in a proceeding, some resources should perhaps be provided in the locality for coordination purposes and to give advice on procedures. This would benefit all parties and result in a shorter, more time-efficient hearing.

## 11 FINDINGS

In this section the examiners summarize the findings from sections 5 to 10 and present overall findings on the application.

### Need for the Plant

1. There is a need for a gas processing plant in the vicinity of the gas reserves. (Section 5.)

### Local Impacts

2. The applicant has made suitable provision for the control of sulphur dust and waste waters, for a fresh water supply, and for the disposal of solid wastes. (Sections 6.1 to 6.4.)
3. The stacks and water vapour plume would be visible to nearby residents and passersby, but would not impose an unacceptable visual impact. (Section 6.5.)
4. Some disturbances and nuisances in the area are likely to occur, but should not have an undue or long-term impact on the community. (Section 6.6.)
5. Trumpeter swans feeding or nesting on the small lakes closest to the plant could possibly be disturbed by sporadic flaring at the plant. Otherwise, the direct effects of the plant's flare and plume would be negligible. (Section 6.7.)
6. Impingement of sulphur dioxide or other emissions would not affect human or animal life. (Section 6.8.)

7. The plant design would incorporate adequate safety features; however, the operation of the plant should be thoroughly tested on an attended basis before unattended operation were allowed. (Section 6.9.)
8. The plant would not significantly affect local land values or development potential. (Section 6.10.)

#### Regional Impacts

9. The effects of the proposed plant's emissions of sulphur dioxide and oxides of nitrogen on the region's soil cannot be predicted with absolute certainty, but should be negligible and limited to a relatively small area. Otherwise, no adverse effects would be expected. (Section 7.1.)
10. Emissions from the proposed plant would not cause perceptible acid rain. (Section 7.2.)
11. The evidence of possible past occurrence of adverse effects due to poor operations at another plant should be used in only a cautionary way in the consideration of the proposed plant. (Section 7.3.)
12. Sulphur deposition from future gas and oil sands plant operations in the region would not significantly overlap deposition from the proposed plant. (Section 7.4.)
13. The obligations and undertakings of the company to measure effluent streams and conduct or participate in monitoring activities are adequate. (Section 7.5.)
14. Liming of soil should not be required, but would be a possible restorative procedure on agricultural lands should acidification by sulphur deposition occur. (Section 7.6.)
15. The site selected for the plant is appropriate and, on balance, is preferable to alternative sites. (Section 7.8.)
16. The Horse Lake Indian Band would benefit greatly from the royalty on the production of gas from its lands. Whereas some individuals in the general area might suffer modestly higher costs and intrusion into a chosen way of life as a result of the plant's operations, others would benefit. The effects on the community of succeeding phases of industrialization are largely unavoidable. (Section 7.9.)

#### Other Issues

17. Subject to possible modification of the sulphur recovery facility design, the applicant has proposed a plant design which would minimize undesirable emissions, and be safe and efficient. (Section 8.1.)

18. The plant would be capable of meeting ambient air quality standards. (Section 8.2.)
19. Adequate precautions have been taken to identify and protect archaeological and historical sites. (Section 8.3.)
20. The sulphur deposition model used by the applicant requires further proving before its accuracy can be fully relied upon for the purpose for which it was used in the application. (Section 8.4.)

#### Sulphur Recovery Guidelines

21. While recognizing the Alberta sulphur recovery guidelines in effect at the time of the hearing of the application, and the sulphur recovery efficiency of 97 per cent proposed in the application, it is appropriate also to consider the new Alberta sulphur recovery guidelines issued in November 1980 as Informational Letter IL 80-24. The right of the applicant and interveners to express alternative views on the use of IL 80-24 is recognized. (Sections 7.7 and 9.)

#### Overall Findings

22. There is considerable scope for: public education on environmental impacts, monitoring and research programs on effects of sulphur deposition, assistance to interveners in co-ordinating and presenting their views at hearings. (Sections 7.1 and 10.)
23. Having regard for the sensitive nature of some of the soils in the area, for the current state of knowledge of effects of sulphur dioxide on the soils, for the state of the art of sulphur recovery as recognized in the newly announced guidelines, and for other factors discussed in this report, a sulphur recovery level of 98.0 per cent (normal operating basis) would be appropriate. Expressed as an emission, 10 tonnes per day of sulphur dioxide or 5 tonnes per day of equivalent sulphur would be emitted on average. The corresponding minimum quarterly average sulphur recovery would be 97.7 per cent.
24. It is appropriate that the application be approved subject to conditions reflecting the findings of this report, the undertakings made by the applicant in the application and in testimony at the hearing, and to the applicant satisfying the Board prior to commencement of construction that adequate provision is being made to achieve the sulphur recovery level specified in Finding 23.
25. The applicant and interveners be allowed three weeks to respond respecting the use of the revised sulphur recovery guidelines.

## 12 RECOMMENDATIONS

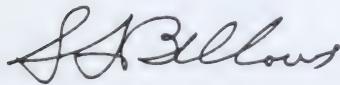
The examiners, having considered all of the evidence, recommend that:

- (a) the application of Chieftain be approved
- (b) the approval contain clauses which require that:
  - i Chieftain satisfy the Board, prior to the completion of the final design of the plant, that it would be capable of recovering 97.7 per cent of the inlet sulphur on a quarterly average basis,
  - ii before the plant is operated without the fulltime presence of one or more operators, Chieftain satisfy the Board that the plant and related field facilities are equipped and functioning to properly control emergency situations, and
  - iii recovery of sulphur from block storage not be by mechanical breaking unless prior approval is obtained from the Board
- (c) the applicant and interveners be allowed three weeks from the date of forwarding of this decision to file with the Board any response they may wish to make respecting the use of the new sulphur recovery guidelines in connection with the subject application.

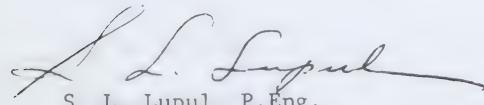
DATED at Calgary, Alberta on 20 November 1980.



H. J. Webber, P.Eng.



L. A. Bellows, P.Eng.



S. L. Lupul, P.Eng.



## APPENDIX A

## THOSE WHO APPEARED AT THE HEARING

Principals and Representatives  
(Abbreviations Used in Report)Witnesses

Chieftain Development Company Ltd.  
(Chieftain)

D. G. Ingram

N. Orr, P.Eng.  
E. Berlie, P.Eng.  
D. Colley, P.Eng.  
G. Lutonas  
C. Seright  
of Western Research and  
Development  
J. A. Lore  
E. McCulloch  
of McKinnon, Allen and  
Associates  
L. O'Rourke  
of O'Rourke Engineering

Alberta Women's Institutes, Ray Lake Branch

B. Vainio

B. Vainio

Edward T. Barnes

A. Romanchuk

A. Romanchuk

John Blum

J. Blum

Robert and Gloria Callihoo  
(The Callihooes)

G. Callihoo

R. Callihoo  
G. Callihoo

Linda and Rodney Elvestad  
(The Elvestads)

L. Elvestad  
R. Elvestad

L. Elvestad  
R. Elvestad  
Dr. W. T. Nagge  
of Peace River District  
Regional Diagnostic Laboratory  
at Fairview  
R. Purdy

Ellie Epp

E. Epp

G. W. Fischer

G. W. Fischer

Aimee O. Gibson  
G. Loberg

G. Loberg

The Alexander Harpes  
Alexander Harpe

Mrs. B. Harpe

THOSE WHO APPEARED AT THE HEARING cont'dPrincipals and Representatives  
(Abbreviations Used in Report)Witnesses

Andre Harpe

Andre Harpe

Olaf and Tara Harpe  
D. CarterO. Harpe  
T. Harpe  
Dr. R. Klemm  
of Alberta Research CouncilRichard and Anne Harpe  
R. HarpeR. Harpe  
F. SoltermanHorse Lake Indian Band  
(Horse Lake Band)  
Chief J. Horseman

Chief J. Horseman

Alan Johnstone

A. Johnstone

La Glace and District Petitioners  
A. Moreside

A. Moreside

Gerald and Emily Loberg  
G. Loberg  
E. LobergG. Loberg  
E. Loberg

Ken Lumbis

K. Lumbis

Yvonne McAllister

Y. McAllister

The Peace Country Acid Soils Committee  
J. Roschlaub

J. Roschlaub

Regional Petitioners  
P. Kirley

P. Kirley

Irmgard Tiesenhausen

I. Tiesenhausen

Nils Tiesenhausen

N. Tiesenhausen

Roman Tiesenhausen

R. Tiesenhausen

The Trumpeter Swan Society  
(Swan Society)  
E. Stamm

E. Stamm

THOSE WHO APPEARED AT THE HEARING cont'dPrincipals and Representatives  
(Abbreviations Used in Report)Witnesses

The Valhalla (SOS) Save Our Soils  
R. Harpe

R. Harpe

The Village of Hythe  
P. Bellaire

P. Bellaire

Alberta Environment  
J. Defir, P.Eng.  
D. Lamont

Energy Resources Conservation Board staff  
J. D. Dilay, P.Eng.  
K. Hunt, P.Eng.  
R. Eng.  
M. Craig



**LUSCAR LTD.**  
COMPRESSOR STATION AND  
PIPELINE APPLICATIONS  
ROUND HILL - DODDS AREA

Decision Report 80-27  
Applications 800542,  
800598, and 800626

## 1 INTRODUCTION

### 1.1 The Application

Luscar Ltd. applied under The Oil and Gas Conservation Act for a permit to construct a gas battery and compressor station, and under The Pipeline Act, 1975, for permits to construct the associated gas gathering and sales gas pipelines.

Application 800542, is to construct a gas battery and a 920 kilowatt (kW) (1232 B.H.P.) gas compressor station in legal subdivision 4, section 35, township 48, range 18, west of the 4th meridian.

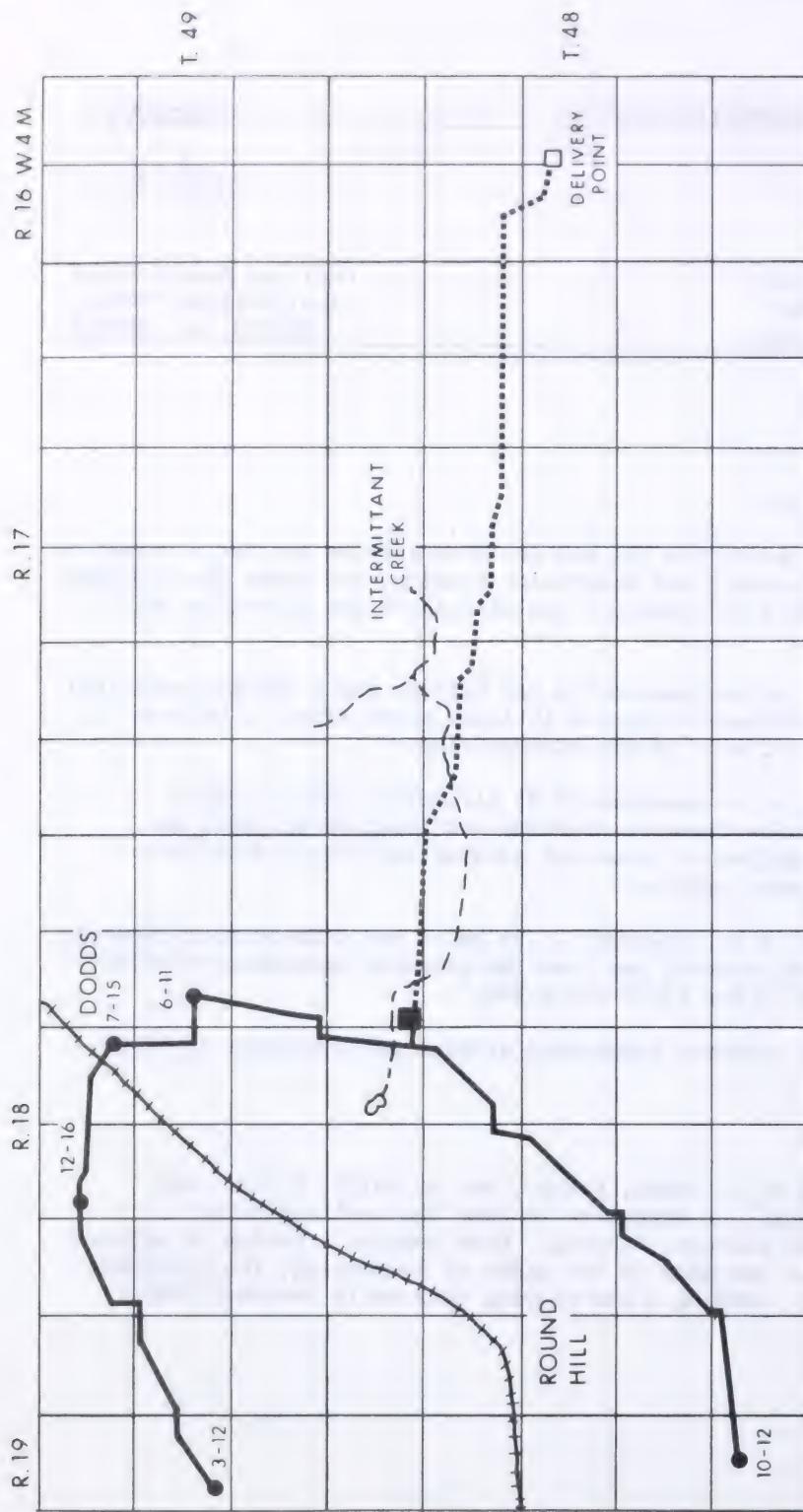
Application 800598, is to construct 9.06 kilometres (km) of 114.3 millimetre (mm) outside diameter pipeline and 16.42 km of 168.3 mm outside diameter pipeline to transport natural gas from gas wells to the proposed compressor station.

Application 800626, is to construct 15.56 km of 168.3 mm outside diameter pipeline to transport natural gas from the proposed compressor station to a delivery point in Lsd 13-20-48-16 W4M.

The location of the proposed compressor station and pipelines is shown on Figure 1.

### 1.2 The Hearings

The Board appointed R. G. Evans, P.Eng., Wm. H. Wolff, P.Eng., and E. R. Brushett, P.Eng., as examiners to hear the application on 30 September 1980 in Camrose, Alberta. Upon hearing a motion to adjourn by local interveners who were in the midst of harvesting, the examiners granted adjournment, setting a new hearing date on 18 November 1980.



PROPOSED LUSCAR LTD. PIPELINE FOR THE TRANSMISSION OF NATURAL GAS (APPL NO 800598)  
 PROPOSED LUSCAR LTD. PIPELINE FOR THE TRANSMISSION OF NATURAL GAS (APPL NO 800626)  
 PROPOSED COMPRESSOR STATION (APPL NO. 800542)  
 WELL SITE

FIGURE 1 ROUND HILL - DODDS AREA.

Subsequent to the adjournment, Luscar Ltd., (Luscar) made an application to the Board to set down the 18 November 1980 hearing as a Board hearing. Therefore, on 18 November 1980, V. E. Bohme, P.Eng., and acting Board members L. A. Bellows, P.Eng., and E. G. Fox, P.Eng., heard the applications in Camrose, Alberta.

### 1.3 Interveners

Interventions were filed with the Board from the Diamond E Ranch (R. W. and E. Bowthorpe), Mr. and Mrs. D. Strilchuk, T. Nahirniak, R. A. Anderson, Mr. and Mrs. H. Nahirniak, Northwestern Utilities Limited, and Calgary Power Ltd.

The following table shows those people who registered at the hearing for the purpose of presenting evidence and cross examination.

#### THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Luscar Ltd. (Luscar) G. Watkins	G. H. Yip, P.Eng. L. A. Church, P.Eng. J. W. Pearson
Diamond E Ranch Mrs. E. Bowthorpe	Mrs. E. Bowthorpe
B. Bowthorpe	B. Bowthorpe
R. A. Anderson	R. A. Anderson
T. Nahirniak	T. Nahirniak
H. Stauffer	H. Stauffer
Energy Resources Conservation Board staff (Board staff)	
K. Miller, Board Solicitor R. D. Florence B. C. Hubbard, E.I.T. H. W. Knox, P.Eng.	

Calgary Power Ltd., and Northwestern Utilities Limited did not appear at the hearing to present their interventions.

## 2 THE ISSUES

The Board considers the principal issues of these applications to be:

- the location of the gas battery and gas compressor station, and
- the design of the facilities.

## BACKGROUND

At the hearing the applicant stated the compressor station and pipelines were needed to produce the gas reserves from its wells to meet contractual commitments with TransCanada Pipelines. Luscar also indicated that it had approached Northwestern Utilities Limited, and NOVA, An Alberta Corporation, regarding construction of a sales gas line to avoid duplication of pipeline facilities in the area, but as no firm commitments could be obtained, it decided to proceed with construction of its own sales gas facilities. Luscar stated that, in its opinion, the systems as proposed represented orderly and economic development of the area.

The need for the facilities was not challenged by the interveners.

## 3 LOCATION OF THE COMPRESSOR STATION

## 3.1 The Applicant's Views

The applicant presented evidence dealing with the methodology of selecting the compressor station site. The criteria, included:

- remoteness from residential dwellings,
- future development of the area, and land use considerations,
- proximity to roads, and electric utilities, and
- ability to obtain a voluntary agreement with the landowner.

Several sites were evaluated and the applied for site was selected as best meeting the criteria.

Luscar also reviewed alternate locations to the north and east of Dusty Lake, as proposed by the interveners in the time between the two hearings. It stated that it had rejected these because of significant cost increases (\$154,800 and \$273,800, for the respective sites) caused by having to construct several more miles of pipeline. Several miles of power line would also be needed to service the compressor station, thereby restricting land use. Luscar stated that moving to the alternate sites would not result in lower impacts to residents near those locations.

The applicant presented a plot plan of the proposed site indicating ground elevations in relation to the intermittent creek near the site to support its view that the compressor station could be built and operated safely near the creek in a "flood" condition.

### 3.2 Intervenors' Views

The intervenors voiced concerns about the proposed location of the gas battery and compressor station because of its proximity to the intermittent creek. They believed that in a flood situation the station would be affected, thereby allowing pollutants such as salt water, triethylene glycol and lubricating oils to enter the watercourse.

One intervener proposed that alternate sites near Dusty Lake, some 5 to 8 km (3-5 miles) south-east of the proposed site, would be preferable since less valuable land would be used and fewer residents would be affected. No details on the proposed alternatives were presented.

### 3.3 The Board's Views

The Board considers the probability of occurrence of a flood of significant magnitude to adversely effect the compressor station to be minimal.

The Board has considered the intervener's proposed alternative locations but believes that the additional cost to the applicant would be significant. The evidence indicated that no reduction in impact on landowners would be realized since farmsteads occur just as near to those sites and more land could be effected if new power lines were needed to service the compressor site.

## 4 DESIGN OF FACILITIES

### 4.1 The Applicant's Views

The equipment to be located at the compressor site would include a glycol dehydrator, a compressor, driver, emergency flare pit, a storage tank for produced salt water, and containers for spent lubricating oils. The above ground salt water storage tank would be enclosed by a dyke.

Luscar stated that a high liquid level shut-off would be installed on the salt water storage tank at the compressor station. It also stated that, if required by the Board, it would consider shallow wells offset from the underground storage tanks that may be installed at the wells (if wellhead separation is needed in the future), to monitor for potential salt water migration from a leak.

The applicant stated that residential mufflers will be installed on the compressor driver to maintain a level of 50 decibels; lower than required by the Board's Interim Directive ID 80-2, "Noise Control Guidelines". It also stated that the exhaust stack had been designed to meet the requirements of Alberta Environment and the Board with regard to NO<sub>2</sub> emmissions.

It was also indicated that the company was currently considering a flare-stack and liquid knock-out drum to replace the blowdown pit.

#### 4.2 The Intervenors' Views

The intervenors believe that the applicant did not give enough consideration to the potential environmental impacts when designing the proposed facilities, particularly those for salt water storage. They were concerned about Luscar's ability to monitor the level of salt water in the tank at the compressor station and salt water damage that might occur at the well sites should the underground storage tanks leak.

The intervenors were also concerned about noise and NO<sub>2</sub> emissions from the proposed compressor station.

#### 4.3 The Board's Views

The Board believes that the added safety to be obtained by installing the high liquid level shut-off on the salt water tank at the compressor station is justified. It also sees the merit of monitoring for salt water migration from underground storage tanks when installed.

The Board agrees that the facilities as proposed will meet noise and NO<sub>2</sub> emission standards set by the Department of the Environment and the Board.

The Board finds that the liquid knock-out drum and flarestack conform with the objective of environmentally sound industry operations and should be installed on new facilities.

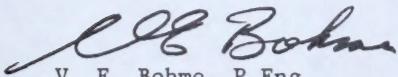
The Board, having considered the evidence presented at the hearing, hereby approves the applications of Luscar Ltd., subject to the following conditions:

- (1) Luscar shall replace the proposed blowdown pit with a liquid knock-out drum and flarestack,
- (2) Luscar shall install and maintain a high liquid level shut-off device in the proposed salt water storage tank, and
- (3) If underground salt water storage tanks are installed at the well sites, Luscar shall install at least one leak detection well at each tank.

The permits to construct the applied for facilities will be issued in due course.

ISSUED at Calgary, Alberta, on 12 December 1980.

ENERGY RESOURCES CONSERVATION BOARD



V. E. Bohme, P.Eng.  
Board Member



L. A. Bellows, P.Eng.  
Acting Board Member



E. G. Fox, P.Eng.  
Acting Board Member





